SENSE-MAKING AND STRATEGY DEVELOPMENT IN UNDERPERFORMING TEAMS

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ABSTRACT

Virginia R. Stewart: Sense-Making and Strategy Development in Underperforming Teams
(Under the direction of Benson Rosen and David Hofmann)

This dissertation contributes to our understanding of how underperforming teams adapt in response to negative team feedback about team outcomes. I focus my attention on the transition phase that occurs between team performance cycles and identify retrospective sense-making about the failure and prospective strategy development as key processes that can help explain how teams react to underperformance feedback. I argue that the extent of the team underperformance deficit and the accountability structure in place will influence team sense-making about failure, revisions in team task execution strategies, and the magnitude of changes in subsequent team performance.

After conducting a series of pilot studies to develop a laboratory methodology appropriate for answering my research questions, I collected data from 43 teams that worked together to assemble paper Ferraris during two production shifts. Following the first production run, teams received feedback that they had underperformed relative to the mean (slight or severe deficit) and that they would be held accountable for subsequent performance (as a team or both as a team and individually). I relied on self-report, observational coding of recorded team discussions, and observer evaluations of team product to assess my outcome variables of interest.

Results indicate individuals who work on teams that received severe negative feedback are privately more pessimistic about the team processes that contributed to

underperformance but that collective sense-making processes yielded greater changes in role responsibilities, more radical revisions in workflow, and more offers to help teammates going forward. The accountability structure interacts with the size of the underperformance deficit such that when a team has only slightly underperformed, introducing greater individual accountability serves to inhibit team discussion of the causes of failure, yields more minor revisions in individual responsibility and workflow patterns, and dampens offers of extra role helping and participation in leading the team. The implication of these findings is that frame-breaking changes in how a team carries out its work are most likely to occur naturally in new teams that feel they have nothing to lose and that increasing individual accountability does not universally drive team adaptation in response to failure.

To my mother K.H.S., who taught me to read and write.

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CHAPTER 1: INTRODUCTION

Despite organizations increasingly relying on teams to process and execute work demands, teams do not always succeed. The dynamics on these failing teams can be distressing to members and frustrating to managers. When I surveyed 139 experienced project managers about the causes of and remedies to team underperformance, a theme of powerlessness emerged. One participant recalled that "decisions were discussed over and over again; focus in the status meetings was on finger pointing rather than identifying ways to help each other to get items delivered." Another participant described engaging in wishful thinking that "things may get magically better, circumstances may occur that allow a group outside to take the blame." A third participant observed that "discussions sometimes turn into blame-fixing exercise; faced with a decision between in-fighting or ignoring—many managers will simply ignore and vow to do better next time; in other words, many times there are no consequences." Perhaps with the right managerial interventions underperforming teams can be reliably turned around, but the managers I surveyed repeatedly reported a shortage of skills in delivering negative feedback to a team in a way that fosters team growth.

According to team adaptation theory, adaption occurs when teams become aware of the need for change and formulate and execute a revised task strategy, which leads to a functional change in team performance (Burke, Stagl, Salas, Pierce, & Kendall, 2006).What factors might explain when negative team feedback elicits effective task revisions and improved team outcomes versus stagnation or even further deterioration? To begin addressing this question, I extend team adaptation theory by examining in detail the

collective sense-making that occurs after teams receive negative performance feedback. I argue that failing teams make sense of and act on negative performance feedback differently based on two particular issues: the size of the performance deficit and also the nature of team accountability mechanisms.

Although performance feedback is a cornerstone construct in a multitude of theories designed to explain and predict behaviors, the diverse ways in which work teams process and respond to performance feedback remains underexplored terrain in the prevailing management literature. The vast majority of studies on performance feedback have focused on its impact on individual motivation and performance (c.f. Kluger & DeNisi, 1996) which leaves a gap in our knowledge of how performance feedback affects team processes and outcomes. An expedient solution is to assume that team and individual reactions are parallel in nature: negative performance feedback should drive adaptive changes and positive performance feedback should maintain or even reduce the effort of both individuals working alone or functioning as part of a team. Yet decades of social psychology studies have clearly demonstrated that the real or imagined presence of others exerts tremendous authority on individual behaviors through processes of social influence and social comparison.

Furthermore, the handful of frameworks that do specifically address team responses to performance feedback tend to discount the differences between negative and positive performance feedback despite evidence that they are inherently unique and researchers should not treat them as "two sides of the same coin" (Bacharach, Bendoly, & Podsakoff, 2001). Whereas positive team performance feedback signals that no action is required and that effort should therefore be maintained or even decreased, negative team performance feedback should be interpreted as a clear signal for change. Under some conditions, negative

performance feedback is indeed a catalyst for teams to solidify commitment to collaboration or to critically assess and revise their strategies for pursuing their goals. However, there is also evidence that negative performance feedback can instead create conditions conducive to discord, dithering, or distancing behaviors. For example, empirical studies indicate that providing teams with negative performance feedback can drive down individual motivation (Barr & Conlon, 1994), spur members' desire for distance from the unit (Snyder, Lassegard, & Ford, 1986), distort perceptions of organizational citizenship behaviors (Bacharach et. al, 2001), impair satisfaction with the team and undermine collective efficacy beliefs (Prussia & Kinicki, 1996), and increase relationship conflict and impair subsequent performance (Peterson & Behfar, 2003).

Examining the severity of the negative team performance feedback should help explain when teams are more likely to increase their effort and less likely to reject or ignore feedback. Low levels of negativity may be inspirational and help build confidence and efficacy, whereas high levels of negativity may paralyze a team. The opposite could also hold, where small performance slippages may fail to trigger adaptation, either because of complacency or because a narrow miss could be more demoralizing.

A secondary concern is the expectation of being held accountable as an individual or a team for how well a task has been performed and the extent to which these accountabilities are visible. When a team succeeds, there is usually little need for individuals to explain or justify their contributions, but when a team does not meet stipulated expectations, individuals are prone to reflect by asking "whose fault is it?" while engaging in diagnosis and strategy discussions. Under conditions of intense individual accountability, for example where individual role expectations and evaluations are shared among teammates, interpretations of

negative team performance feedback and strategy development are likely to differ compared to when unique responsibilities and performance outcomes are not disclosed.

By focusing on the transition period between performance episodes when teams take stock of their previous performance and revise their task strategies, my investigation broadens our theoretical understanding of when and why critical changes do not occur following failures in interdependent contexts. I propose that individual and team responses to underperformance feedback depend in part on the severity of the deficit and accountability structure. My research investigates the critical transition period between performance episodes and examines the comparative, attributive, and interactive processes activated by collective failure during a time when social interactions are still largely missing from the study of groups (Cronin, Weingart, & Todorova, 2011). Practical implications of this work include the identification and investigation of several organizational variables available for managing team performance (House, Rousseau, & Thomas-Hunt, 1995).

The following chapter of this dissertation is a literature review, which starts by positioning team response to performance feedback within major models of how teams work. I then focus on how teams make sense of failure before narrowing to consider how social influences can impede or enable adaptive responses to team underperformance. Based on the literature I review, I identify the extent to which the team underperformed as well as the performance accountability structure as two core constructs in understanding team sense-making and strategy revision in response to underperformance feedback. I pose a set of exploratory research questions about the ways in which the underperformance deficit and accountability structure might independently and interactively affect team responses to failure feedback.

In the third chapter I summarize the methods and results of several pilot studies intended develop manipulations of accountability and underperformance and which also provide preliminary tests of the relevance of the accountability locus and underperformance deficit in explaining my outcome variables of interest. The results of the literature review and pilot studies inform the hypotheses I develop in the third section, which I formally test with the methodology I present in the fourth chapter of this paper. I present my results in the fifth chapter and conclude with a discussion of my findings and how they contribute to the literature on teams and outcome feedback.

CHAPTER 2: LITERATURE REVIEW

Transitional Team Processes

A team is a small collective of individuals brought together to perform organizationally relevant tasks and whose workflow is characterized by interdependency (Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006). Although team performance information has traditionally been viewed as an outcome rather than an input to team processes (Cohen & Bailey, 1997; Ilgen, Hollenbeck, Johnson, & Jundt, 2005), there are several theoretical models of how teams work in general that serve to broadly identify the cognitions and activities instigated upon receipt of negative team performance feedback.

Theories of team motivation and goal-setting tend to focus on how performance feedback has the power to influence proximal motivational states of the team, individuals on the team, or both simultaneously or recursively. The idea at the core of these models is that entities require such information to self-regulate their behaviors. These models suggest that the value of performance feedback is that it permits actors to learn where they stand relative to set goals and then redirect their efforts and strategies toward specific outputs (e.g., Chen & Kanfer, 2006; DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988).

In models that consider both individual and team responses to performance feedback, the effects of feedback on emergent states and strategy development are argued to occur in parallel at both the individual and team level (Chen & Kanfer, 2006; DeShon et al. 2004). Such functional equivalency means that individual performance feedback influences

individual effort and individual strategies for goal pursuit while team performance feedback influences team motivation and team goal striving. Although the narratives that accompany these models focus on performance feedback in general rather than feedback related to poor performance or of varying levels of severity, they do highlight that performance feedback targeted at different audiences serves to draw attention to the activities of particular actors.

Inherent in the arguments of team motivation and goal-setting theories is the notion that team performance is either observable or explicitly measured and then transmitted to the team for consideration. The phase during which team members pause and take stock of how well they performed during the previous episode and also ready themselves for subsequent performance activities has been categorized as a transition period or point (Kozlowski, Gully, Nason, & Smith, 1999; LePine, Piccolo, Jackson, Mathieu, & Saul, 2008; Marks, Mathieu, & Zaccaro, 2001). During this time team members engage in different team processes than when they are focused on work tied directly to goal accomplishment. Specifically, the transition period is the phase when a team analyzes its mission, specifies and prioritizes goals, and develops alternative courses of action for accomplishing the mission (Marks et al., 2001). In a team that has completed a performance episode, members are especially likely to spend time reevaluating performance goals and revising the ways in which they will perform the task.

What such models of episodic team processes suggest is that a team is likely to engage in strategy adjustments following negative performance feedback and that these changes will influence subsequent team effectiveness. If the team has prepared contingency plans, underperformance feedback is likely to trigger a backup plan. However, newly formed teams and those that did not anticipate poor performance are much more likely to have to

adapt by reinventing the original plan or abandoning it and quickly developing a new strategy.

The importance of formulating a team strategy in response to performance feedback is also underlined in models of team adaptation (Burke et al., 2006; Randall, Resick, & DeChurch, 2011), in which several preliminary processes are suggested to mediate the relationship between performance feedback and team strategy development. Specifically, Burke and colleagues develop the argument that the adaptive cycle of teams also consists of an initial situation assessment phase during which team members individually gather information about potential problems the team might encounter and then try to make sense of the implications of these problems (2006). Cue recognition is crucial for teams operating in highly complex and uncertain conditions, however it seems reasonable to expect that teams that explicitly receive negative feedback on their performance are less likely to be tripped up by failing to extract a change cue from an unstable environment. Although the team may choose to ignore the underperformance feedback or deny its credibility, the team would be hard pressed to argue they did not perceive the information.

Sense-making and Strategy Development in Response to Failure

Raw information by itself is insufficient for triggering team adaptation as an outcome. Instead the information must be given meaning before the team can decide how to respond to it (Rosen, Bedwell, Wildman, Fritzsche, Salas, & Burke, 2011). Starbuck & Milliken wrote that "noticing determines whether people even consider responding to environmental events; if events are noticed, people make sense of them" (1988: 60). Noticing subtle cues for change is an important capability for teams operating under conditions of environmental uncertainty, yet when underperformance feedback is concrete and provided by a credible external

authority, the meanings that team members ascribe to the poor performance feedback seem more essential to understanding team responses to negative feedback than whether or not they engage in cue scanning activities (Burke et al., 2006).

Any significant event that affects us in important ways is likely to activate a basic human motive to comprehend and understand our environment (Fiske, 2004: 18). To construct the meaning of the negative team feedback, individuals on the team place the performance information into a framework. To engage in sense-making is to "construct, filter, frame, create facticity (Turner, 1987), and render the subjective into something more tangible" (Weick, 1995: 14). Sense-making is therefore a higher-order construct that encompasses categories of interpretations; for example, sense-making is more incipient and emergent and continuous than decision making and more inventive and active than interpretation (Weick, 1995).

Sense-making is a particularly likely response in situations that are confusing, surprising, or negative. These events interrupt business as usual, thereby encouraging people to immediately wonder "why?!" and to actively develop theories to explain what has occurred. Underperformance feedback is especially likely to trigger individual sense-making processes because we tend to attend to and puzzle over events and behaviors that are unusual or unexpected, extreme or negative, and relevant to our current goals (Fiske & Taylor, 1991; Weick, 1995: 47). For example, individual team members likely make sense of negative team feedback by assessing retrospectively the sufficiency of their own contributions to the team relative to others and also by estimating the impact of the negative team feedback on their identity as a competent professional and as a teammate. Furthermore, when there is a strong, salient, and explicit impetus for change—such as experiencing failure, reaching a milestone

in the work of the group, or receiving an outside intervention—individuals in groups are particularly likely to explicitly rethink their routines and engage in mental simulations of hypothetical team situations (Aspinwall & Taylor, 1997; Gersick & Hackman, 1990: 91).

The suggestion is not that sense-making abruptly stops and starts but that receiving underperformance feedback during a marked transition episode between team action phases serves to provoke individual sense-making processes. In the quest to build a coherent narrative about the failure, individuals on a team retrospectively evaluate their own contributions relative to those of other team members and consider how factors internal or external to the team influenced the team's performance. Through cognitions such as these, individuals are able to reach an initial reactive determination of fault and possible resolutions.

Such individual thoughts and intentions then become merged or synthesized into face-to-face conversations and interactions (Wiley, 1988: 254). My argument is that through team members' interactions with each other, individual sense-making contributes to and is informed by team members' interpretations of the team's poor performance. This intersubjectivity emerges from the interchange and synthesis of two or more communicating team members. The team serves as a sounding board for initial individual appraisals, which may have been blatantly incorrect or premature due to avoidant, defensive, or incomplete processing. Discussions of what happened and why and what to do about it, if anything, compile to a team-level construal of what the performance feedback means and how the team should move forward (Kozlowski et al., 1999: 250). This is not to say a shared or uniform understanding is achieved but rather that individual team members align and integrate their

conceptions to construct an account that makes concerted action possible (Stigliani & Ravasi, 2012; Weick, 1995: 43).

Sense-making in response to negative team feedback is therefore grounded not only in individual observations, analyses, and judgments but is also fundamentally a social construction rather than a solitary process (Weick, 1995: 40). Individual thoughts about team negative feedback are created in the context of interactions with teammates and are contingent on the conduct and presence of others. Moving forward as a unit also requires individuals on the team to link their interpretations of the negative performance feedback and develop a collective task strategy. Through this process an individual may acquire new information that may serve to clarify, moderate, reinforce, or revise individual sense-making. Individual biases may sometimes be shared and insufficient processing of potentially threatening stimuli can occur during team sense-making (Aspinwall & Taylor, 1997), but teams that engage in an intellectualized focus on identifying team-centered influences on team underperformance (versus emotionalized, defensive, or oversimplified problem processing) should be in better position to develop strategies that correspond well to the objective demands of the situation.

Figure 1 depicts a general process model of this sequence of events, to include the effects of team sense-making on individual reinterpretations of the performance feedback. My argument is that such social influences on individual sense-making and team construal of the failure can help explain why team responses to negative performance feedback can lead to insufficient strategy revision, which may hamper subsequent improvements in team productivity and efficiencies.

Sensibility to Social Influences

Nadler observed in his review of the experimental research on the effects of feedback on task group behavior that individuals and teams do not automatically self-correct in the way that mechanical systems do (1979). Instead, a host of intervening social factors hold sway over how team performance feedback is interpreted, synthesized, and acted on. The purpose of this section is to broadly review the social forces that specifically influence individual sense-making of negative team performance feedback and subsequent team failure construal and strategy development.

A key factor in individual sense-making of negative team feedback is the extent to which an individual perceives responsibility for the outcome. However, there is quite robust evidence that individuals working collectively as compared to individually can feel less ownership for their actions (e.g., Jackson & Harkins, 1985; Karau & Williams, 1993; Kerr, 1983; Kerr & Bruun, 1983; Latané, 1981; Latané, Williams, & Harkins, 1979; Leary & Forsyth, 1989). According to a meta-analysis of 78 studies of social loafing and free riding, reductions in individual effort are particularly likely to emerge when individual contributions to the team are anonymous or redundant, when the task or group membership is not personally valued, and when the size of the group is large (Karau & Williams, 1993). For team members to perceive a responsibility to take action, they must interpret the negative performance feedback as an 'emergency,' feel their contributions will make a difference, determine the correct course of action, and also follow through on implementation (Fiske, 2004: 336).

To interpret the negative team performance feedback as a call for action and to also take action poses quite a challenge for individuals working in a team. The main reason for

this is that the performance feedback is diluted across several targets rather than a laid on a single individual. Thus, individuals on a team benefit from a reduction in intensity and pressure (Latané et al., 1979) and are less inclined to make sense of the performance feedback in a heedful way. Even if the negative team performance feedback is individually interpreted as a wake-up call, the group can "force inaction on its members" (Latané & Darley, 1968: 217). When everyone else appears to interpret an event as trivial, then the apparent consensus favoring inertia will guide the individual perceiver to also reach the same conclusion.

For many groups and tasks, individual action and ownership decrease to the extent the individuals feel their contributions are irrelevant or anonymous. Dispensability of individual effort is tied to the free rider effect. For example, on tasks in which performance is determined primarily by the most capable group member, the least capable members tend to free ride—e.g., "let George do it"—and on tasks in which performance is determined by the additive outputs of all contributors, the most capable members tend to loaf—e.g., "I'll do the least I can get away with" (Kerr & Bruun, 1983). In both cases, certain individuals can reasonably anticipate that team outcomes will be about the same regardless of whether they contribute little or maximum effort. Identifiability of individual effort is also related to levels of individual effort on collective tasks. For example, on tasks in which individual contributions are anonymous, there is the possibility to "hide in the crowd" and avoid blame for underperformance, but it is also possible to get "lost in the crowd" when it is reward time (Davis, 1969).

The extent to which individuals make self-serving attributions for failure as opposed to egalitarian or group-serving attributions can seed dislike and discord in team settings.

When a group performs poorly, members who claim low responsibility are evaluated less favorably than those who accept more responsibility (Forsyth, Berger, & Mitchell, 1981). In situations where many members make egocentric attributions for failure, group unity may suffer in response to undue finger pointing. If the blame game continues without resolution, disgruntled members may deliberately shun future group involvement. In fact, unjustly blamed group members are reportedly less satisfied with their teams, prefer to work with other groups in the future, and tend to belittle the abilities of their teammates (Shaw & Breed, 1970). Such fallout from unfair blame aligns with research indicating that perceptions of disrespectful treatment by teammates can inhibit group-serving behaviors (Simon & Stürmer, 2003).

When a team succeeds, individuals assign credit to the collective, but under conditions of failure, individuals lean toward assigning blame to individual actors. Beyond self-serving biases, one reason that individuals rather than the collective tend to be the focus of team failure attributions is that individuals seem to develop a "peculiar blindness" to team failure (Naquin & Tynan, 2003). The team halo effect is theorized to result from the complexity of counterfactual thinking about collectives. People are much more likely to hold developed schemas of individual behavior than of team dynamics. This means that sense-making about how individuals contributed to team failure is easier and more accessible than counterfactual thoughts about team interactions (Naquin & Tynan, 2003).

The inhibition of counterfactual thinking about team dynamics is one way in which group membership may help prevent performance disillusionment and instead preserve optimism in the face of failure. Several other socially influenced sense-making processes may also help explain the emergence of a disconnect between poor team performance

feedback and realistic views of the team's abilities (Heath & Jourden, 1997). Team discussions may actually help members reframe the situation in terms of success rather than failure in a way that individuals would find difficult to do by themselves. For example, when conversations highlight the positive aspects of the team's efforts, members focus on what was accomplished rather than what was not and may dwell on the ways in which collective effort exceeded what any single individual could have accomplished alone.

Furthermore, the more complex the task, the greater the flexibility that recipients have in framing a performance shortcoming in a positive light, for example by directing attention to what worked or how outcomes could have been worse or increasing the level of abstraction of the performance standard (Jordan & Audia, 2012). Even when groups do acknowledge a team performance shortcoming during a conversational post mortem, for complex or ambiguous tasks they are hard pressed to reach a full understanding of all the different causal links in task performance (Lindsley, Brass, & Thomas, 1995) and they are better positioned to collectively determine that external factors such as a hostile environment or an inherently difficult task are at fault. Group members may also support one another in separating emotional reactions from performance perceptions, thereby buffering team members from the negative affective reactions to poor performance feedback that prevail more in individuals not working in groups (Heath & Jourden, 1997).

The surveyed literature indeed suggests that even a direct cue for team improvement—such as explicit underperformance feedback—may be ignored, deflected, or misinterpreted due to the social cognitions and interactions inherent in collective work arrangements. The recurrent theme is that teams often have the motive and the means to shrug off poor performance feedback. Without the motive to explore what went wrong and

the commitment to revise team strategies, subsequent performance is likely to remain depressed. The question then becomes what type of underperformance feedback is most likely to inspire productive and collaborative strategy planning and implementation?

Underperformance Deficit as a Key Construct

An important yet overlooked contributor to how teams interpret and respond to negative performance feedback involves the extent of the performance shortcoming. Depending on the size of the shortfall, the perceived negative discrepancies are likely to activate different sense-making reactions, which have distinct implications for subsequent strategies and effort (Bandura & Cervone, 1986). Whether a team imploded or just missed the mark is likely to play a key role in explaining the depth and direction of individual and collective team sense-making processes.

Small performance slippages may enable a team to coast along because the performance target seems attainable in future performance episodes without a need for self-reflection or strategy revision. When a team only slightly underperforms, it is easy for members to make downward comparisons about how much worse they could have performed or to reframe the performance target as having some margin of error. In this situation, poor team performance feedback is likely to be superficially digested with no real impetus for strategy revision. People think as hard as the social situation requires (Fiske, 2004: 124) and it is the teams that receive moderate to severe levels of underperformance feedback that are likely to recognize the need for change, to instigate thoughtful diagnoses of how the team went awry, and to engage in in-depth conversations about ways in which work flows and resources can be revamped to meet objectives. This line of reasoning rests on the collective clarity regarding the need for change, which increases as the performance deficit widens.

People pay more attention to negative behavior and the more negative the behavior, the longer they look (Fiske, 2004: 127).

A countervailing line of reasoning would posit the exact opposite, however; namely that meaningful discourse on the drivers of team failure should be more prevalent under conditions of small performance slippages. The logic is that even though awareness of the need to change may be greater under severe levels of team underperformance, so too are doubts about performance capabilities and motives to engage in defensive cognitions such as psychological distancing and attributing failure to external or uncontrollable causes. For this reason, meaningful sense-making about team failure causes may be more likely under more neutral conditions of small performance slippages (Edmondson, 1999) than at the deep end of underperformance where deficits may activate interfering cognitions and derailing behaviors. Apathy, confidence loss, and relationship conflict are particularly likely in the context of repeated failures (Lindsely et al., 1995) or limited experience working together (Duval, Duval, & Mulalis, 1992; Peterson & Behfar, 2003), whereas scapegoating and finger pointing are likely to occur as rewards and punishments are introduced (Dattner & Dahl, 2011).

It appears that the extent to which a team has underperformed can activate both helpful and dysfunctional processes, likely at the same time. At this point of theory development, my focus is on establishing causal links between underperformance and key team processes without making precise predictions regarding the magnitude and direction of the relationships. My basic expectation is that the extent of underperformance is linked to dampened motivational states at the individual and team level (i.e., efficacy beliefs, team and task commitment, and psychological ownership). My focus, however, is on the sense-making processes triggered by varying levels of underperformance. I expect that the severity of team

failure is tied to situational awareness of the need for changes yet also triggers defensive mechanisms that hinder team discussions of the causes of failure and solutions offered. My preliminary expectation is that sense-making will be most thoughtful and helpful in terms of revising team strategy at slight levels of underperformance. Even though individuals on these teams may not as clearly see a need for thoughtful team discussion as individuals on severely underperforming teams, they should preserve enough confidence and goodwill to avoid getting mired in defensive cognitions, conflict, blame, defensiveness, or apathy, which should enable them to more thoroughly discuss their predicament and how to move forward.

Accountability Structure as a Key Construct

Accountability differs from knowledge of results in that accountability involves holding people answerable for their decisions and actions. Accountability flows from assigned role or task responsibilities (Bergsteiner, 2012: 24) and refers to the "implicit or explicit expectation that one may be called on to justify one's beliefs, feelings, and actions to others and usually implies that people who do not provide a satisfactory justification for their actions will suffer negative consequences ranging from disdainful looks to loss of one's livelihood, liberty, or even life" (Lerner & Tetlock, 1999: 255). As depicted in the accountability process model in Figure 2 (adapted from Bergsteiner, 2012: 190), causal responsibility is established by linking the consequences of a behavior to the accountee. As Hall and colleagues write, "There is perhaps no more foundational element of organizations than accountability … without accountability, individuals would be able to do whatever they wanted, whenever they wanted. The result would be chaos and the breakdown of organizations" (Hall, Zinko, Perryman, & Ferris, 2009: 381).

In general, holding people answerable for their decisions and actions should encourage more deliberate and accurate sense-making processes, reason-giving, and more effortful contributions to team performance. As Figure 2 depicts, establishing consequences for an accountee's behavior encourages reflection on the outcomes and subsequent behavioral responses. Research on individual motivation in group settings consistently points to the importance of accountability for inputs and outcomes in determining initial and subsequent motivation and performance. When team members expect that what they say or do will be linked to them personally and their performance is observable or identifiable, motivation to shirk responsibility is suppressed (Sedikides, Herbst, Hardin, & Dardis, 2002). Specifically, literature on social loafing suggest that accountability is one of the key factors in ensuring that each team member contributes to the best of his or her ability (Miles & Greenberg, 1993; Williams, Nida, Baca, & Latané, 1989). When team members expect to give reasons for what they say or do, faulty attributions for failure should diminish and new strategies should be encouraged. Indeed, accountability has been shown to reduce group-think (Kroon, Van Kreveld, & Rabbie, 1992), safeguard against escalation of commitment (Simonson & Staw, 1992), and decrease self-enhancement biases (Sedikides et al., 2002).

Accountability is a multi-faceted construct (Lerner & Tetlock, 1999) that I bound along several dimensions to mirror an organizational team context. First, the accountability implementation I investigate is established pre- rather than post-task performance. This means that the team is informed of expected outcomes and individual roles are assigned rather than emerging without any structure in place. If a team and its members expect to be evaluated at the end of a task, they should carry out higher quality work because their behavior is tied to consequences. In general, implementation prior to task performance as

opposed to after the work is finished has been documented as a better inhibitor of unproductive defensive bolstering and justification (Lerner & Tetlock, 1999).

Accountability can also vary by what one is accountable for doing. In the team context, this can mean being held accountable for the processes by which work and information are coordinated and shared or being held accountable for team outcomes. Although process versus outcome accountability exert different effects on team information processing and perceptions of control (Lerner & Tetlock, 1999; Scholten, van Knippenberg, Nijstad, & De Dreu, 2007), in business contexts teams are more generally held accountable for outcome-related performance, so this the type of accountability I am investigating.

The facet of accountability that I expect to influence individual and team responses to underperformance feedback is *who* exactly is held accountable—in other words, the locus of accountability. In a team context, who is held accountable can be individual team members, some subset of team members, the collective as a whole, some combination of these entities, or none at all. These are the receivers of accountability expectations from a sender or principal, who is conceptualized here as a legitimate source, external to the team, with known views about desired performance expectations (Lerner & Tetlock, 1999) and credible expertise in evaluating team performance. Regardless of who is held accountable to whom, and for what, and at what time, and through what type of accountability intervention, the underlying principle of establishing causal responsibility through linking behaviors to outcomes remains the same.

I anticipate that who is held accountable will inform attributions of responsibility for team shortcomings and determine obligations, if any, to do things differently moving forward (Bergsteiner, 2012: 107). Per Figure 3, three variations on the locus of team accountability

are: team, team and self, and team and all individuals on the team. In the team-only accountability situation, who is held accountable for team performance is the team as a unit. Causal responsibility at the team level involves linking team behaviors to team consequences, for example by establishing the expectation of evaluation at the team level, providing team-level performance feedback, or rewarding or punishing members based on team performance indicators. Individual behaviors are neither evaluated nor linked to team consequences.

In the second and third accountability variations depicted in Figure 3, team accountability is augmented by self-accountability for one's team role. Monitoring individual performance, introducing performance feedback tailored to one's role responsibilities, or increasing the identifiability of individual contributions to the team increases causal responsibility by linking an individual's team-role behaviors to individual consequences. In the middle diagram, individual causal responsibility is partitioned from team accountabilities, thereby allowing an individual team member to reflect on how his or her individual contributions supported or undermined the collective. The far right diagram depicts a condition of full transparency of individual contributions wherein each individual's role performance and outcomes are known to all team members. In this condition, the accountability sender is implicitly expanded from an external legitimate source to include fellow teammates.

As the locus of accountability drills down from the team level, individual accountability generally increases by means of tightening the link between individual behaviors and consequences. I anticipate that greater individual accountability should activate more effortful and accurate sense-making at both the individual and team levels and

also drive more productive strategy development post-failure feedback, particularly when accountability is to a legitimate audience that is informed about how a task should be optimally performed and expectations of evaluation are established prior to team task performance (Lerner & Tetlock, 1999). In contrast, under conditions of limited visibility of individual performance information, I expect it to be easier for individuals on the team to coast and also to have more difficulty and less motivation to accurately diagnose who and what contributed to underperformance, which should impede the development of effective task strategies.

After a certain point, however, the returns from accountability may diminish. One reason is that increased visibility of individual contributions and performance expectations serves to highlight individual roles on the team, which could backfire by detracting from collective task commitment. Theoretically, making an individual consider her own performance more carefully through accountability interventions serves to shift cognitive processes away from the team level (DeShon et al., 2004), which may be unhelpful for aligning interpretations of the causes of failure and potential solutions. Research has also demonstrated that individuals with low job self-efficacy respond to increases of perceived accountability by decreasing organizational citizenship behaviors (Hall, Royle, Brymer, Perrewé, Ferris, & Hochwater, 2006), which could include contributions to team sense-making and strategy development and motivation on subsequent team tasks.

Another reason for diminishing returns of accountability is that too much perceived accountability might provoke performance anxiety in team members and lead to team tension and conflict. For example, high levels of individual accountability could inadvertently increase the use of unhelpful influence tactics (Fandt & Ferris, 1990; Ferris, Dulebohn, Frink,

George-Falvy, Mitchell, & Matthews, 1997) such as scapegoating of individual team members, which creates a state of psychological vulnerability (Dattner & Dahl, 2011) This would derail team discussions of the causes of underperformance. It may be particularly problematic when individual accountability is high but autonomy is lacking, leading underperformance to be interpreted as a threat rather than an opportunity (Frink et al., 2008; Jackson & Dutton, 1988; Lerner & Tetlock, 1999). If accountability mechanisms are onerous or excessive, team members might experience reactance, which can decrease motivation and increase resentment from perceptions of being overly controlled (Brehm, 1966), perhaps incentivizing cheating or discounting of the accountability system. Furthermore, accountability to an audience with known views and high power can encourage conformity and inhibit complex and self-critical counterfactual thoughts that focus on internal attributions and make upward comparisons about how mistakes can be averted (Morris & Moore, 2000).

Although accountability should generally help teams adapt in response to failure, the preceding sense-making cognitions would detract from quality team discussions of failure causes and remedies. I anticipate therefore that in the case of a significant performance shortfall, the benefits of increased accountability will taper off or even reverse.

Foundational Research Questions

The reviewed literature and my interpretations and reasoning indicate sense-making at both the individual and collective levels is an integral component of responses to team underperformance and that both the severity of the performance shortfall and the locus of the accountability structure will influence adaptive reactions and planning for subsequent teamwork. Figure 1 depicted how performance feedback seeds sense-making and strategy

development processesFigure 2 outlined how responsibilities link behavior to consequences, which motivate accountee reflection and responses. I present my integration of these relationships into a process model of team responses to feedback in Figure 4. Specifically, role and task responsibilities guide the behavior of team members. Performance feedback is a consequence of team member behaviors. Causal responsibility, which is informed by assigned roles and tasks, is established by connecting accountee behavior and performance feedback. Performance feedback instigates reflections on results, which I deconstruct into individual and collective sense-making, both of which inform the other. Collective interpretations of team performance drive accountability responses, which include the development and selection of team action strategies and subsequent task performance. Performance outcomes then feed back into the sense-making cycle.

The foundational research questions I am asking are therefore:

Research Question 1. How do the size of the performance deficit and locus of accountability affect individual sense-making of team underperformance?

Research Question 2. How do size of the performance deficit and locus of accountability affect team-sense making of team underperformance?

Research Question 3: How do the size of the performance deficit and locus of accountability affect team strategy revision for subsequent performance?

Research Question 4: How do the size of the performance deficit and locus of accountability interact to affect subsequent team performance?

CHAPTER 3. PILOT STUDIES

Overview of Pilot Studies

I conducted a trio of experimental pilot studies to begin answering my foundational research questions about the effects of differing loci of accountability and the extent to which a team had underperformed on sense-making about team performance and strategy revisions. My secondary purpose was to cultivate a methodology for manipulating accountability and underperformance in a precise and controlled manner and also to develop reliable observational and artifact coding protocols of team interactions and performance.

In selecting my research methodology, the key issue was to determine which method can best be expected to provide valid answers to my research questions (Campbell, 1986). My questions are currently most appropriately investigated in a laboratory setting for several reasons. First, this setting enables me to randomly create teams that are equivalent in size and tenure and that work to complete an identical task in the same amount of time, while also holding constant the selection criteria and reward structures. Because team experiences differ only by the locus of accountability and severity of the underperformance deficit, I can eliminate more alternate interpretations of my results, which will strengthen my confidence in my conclusions (McGrath, 1982).

Second, I am trying to draw conclusions about the processes that team members engage in on receipt of two specific interventions. To give the processes of interest a fair hearing in a lab setting (Mook, 1983), high participant involvement is the field element I most need to replicate (Locke, 1986), so I designed a team task that requires social

interaction and is inherently enjoyable to perform. In addition to preserving the sense-making and strategy development processes of interest, the laboratory venue allows me to observe and record target processes that would be extremely difficult to capture in an organizational setting due to timing and concerns about protecting employee privacy (Ilgen, 1986). Furthermore, if I can demonstrate the power of simplified underperformance and accountability interventions on these processes, even under limited conditions that ought to inhibit their impact, my trust in my conclusions is all the stronger (Mook, 1983).

My first pilot study was designed to test the effects of three levels of accountability and three levels of underperformance on the outcomes of interest. The intermediate levels of the underperformance and accountability manipulations generated results that were problematic to interpret, so I streamlined my analyses to focus only on the highest and lowest levels of each condition. The results from my first pilot study also indicated that my initial accountability manipulation needed strengthening, so in my second pilot study I held underperformance constant and established the expectation of accounting to a credible external authority for either team-only performance or team-and-all-individuals performance (referred to as "full" accountability). I also extended the duration of the team tasks to widen the range of possible team outcomes. I then conducted a third pilot study to fine-tune my accountability manipulation checks.

Pilot Study 1 Methods

I describe the methods I used for my first pilot study in detail because my dissertation methodology is based on this research design. The full protocol is available in the Appendix 1 (Pilot Study 1 Protocol).

Participants. The total sample size was 139 students enrolled in a Fall 2012 course on the foundations of organizational behavior and divided into 36 teams. After removing the intermediate levels of the two experimental conditions, the sample size was 61 participants working on 16 teams of three to four members.

The mean age of this subset was 21.1 years, half were male, and 27.9 percent self-reported as non-white or non-Caucasian. A small number of participants reported having worked with at least one teammate on a previous academic or professional assignment or being personal friends with one or more teammates (14.8 percent and 11.5 percent respectively). 91.8 percent of the sample reported part-time or casual work experience (average of 32.7 months), and 68.9 percent reported full-time work experience (average of 14.3 months).

Procedures. The team assignment was to manufacture paper Ferraris during two 12-minute production runs that required sequential collaboration. I selected this type of task because effective team performance required a high level of interdependency but the workflow also allowed the ostensible isolation of individual contributions for the full accountability manipulation. Newly formed teams were used for convenience and also because teams starting from scratch on a new task would have no prior performance expectations or existing teamwork strategies, which could weaken the believability of the underperformance manipulations.

On each team, individual members were randomly assigned to a specific role responsibility (i.e., cutting out the vehicle body, applying paint, folding to prepare the body for assembly, and assembling the vehicle with tape or glue). Skill differentiation and authority differentiation were both low (Hollenbeck, Beersma, & Schouten, 2012). Roles did

not require any specialized knowledge or functional abilities and decision-making responsibility was vested in the team as a whole rather than in a designated team leader.

Teams received performance feedback after their first Ferrari production run, reported individual sense-making about the team's performance while sitting at private computer stations, and then had up to seven minutes for a videotaped group discussion of what went well and what went poorly as well as what (if anything) to change going forward. After filling out a team planning document and privately reporting on commitment to the team and its strategic plan, the team reunited for a second Ferrari production run.

Experimental manipulations. The experimental manipulations of severity of underperformance and outcome accountability occurred after the teams finished their first production run. A research assistant collected the finished and unfinished vehicles in a box marked "Quality Control" and took them to a separate area for quality inspection. Teams earned points for each completed Ferrari and lost points for wasted resources and a predetermined number of quality control failures (six for each team).

Rather than introduce an accountability locus at the beginning of the team session, I deliberately decided to establish accountability expectations immediately prior to team sense-making and strategy discussions for four reasons: (a) I needed to establish a measure of initial team performance against which I could measure post-intervention performance gains; (b) introducing the accountability locus earlier would have impacted both production runs and team feedback only during the second run, which would make it difficult to assess their differential effects; (c) my chosen timing increases the salience of the intervention on the key processes of interest; and (d) teams would have a clearer sense of the task requirements and distributions of responsibilities after completing a round of production.

Locus of accountability was manipulated at two levels and fully crossed with the two levels of underperformance. In the team-only condition, members only received performance information targeted at the team. Sixteen quality control issues were listed without any specific individual role accountabilities. In the full accountability condition, members received an additional performance report in which the 16 quality control issues were connected to specific role responsibilities.

All teams also received deceptive feedback that their performance was under average in comparison with other similar production lines. The extent of the performance shortfall was pilot tested at slight (47th percentile) and severe (17th percentile). To ensure that the deficit was attended to, in addition to providing each member of a team with an identical team performance report, the numeric ranking was accompanied by a graphical distribution marked with an arrow and a number (e.g., "-3") in red ink that drew attention to how far below the mean the team had performed. For those teams in the full accountability condition, the feedback on how well an individual performed his role was based in part on actual observable quantitative performance (e.g., "number of cars painted" or "number of cars assembled"), but the information on relative individual performance was in the same predetermined underperformance range as the team.

Measures. After receiving feedback on the first production run, individuals responded to a series of questions intended to tap into private sense-making regarding their team's performance. Two counter-balanced items asked "to what do you attribute your team's success [shortcomings]" and provided space for open-ended responses. Sample attributions for shortcomings include "poor communication," "annoyance at one of the team members," and "I wasn't able to assemble fast enough using tape." Individuals then responded to a series

of 18 statements about the team and its functioning as a group (adapted from Campion, Medsker, & Higgs, 1993). Individuals also reported the extent to which they felt a sense of psychological ownership for their work using five items adapted from van Dyne & Pierce (2004); sample items include the extent to which participants felt "attached to the results of your work" and "a sense of ownership for the vehicles you work on." Cronbach's alpha (α) for this scale was .87.

Team sense-making and strategy development were assessed by observational coding of recorded team discussions. Coding of team sense-making focused on problem identification while strategy development coding focused on the suggestions of distinct solutions to team underperformance. The strategy coding also included setting future quantity and quality goals for the second production run as well as plans to revise the workflow and role assignments. Team commitment to the revised strategy was assessed through four items (α = .77). Sample statements include "I endorse our plan going forward" and "most members of my team appear enthusiastic about how we intend to work together."

Team performance was assessed through artifact coding of team product. Both finished and unfinished Ferraris were collected at the end of each production run for counting and quality evaluations. Inefficiencies were measured by counting wasted resources such as the materials used for Ferraris that were not fully assembled by the end of a production run. The quality of each of the 72 assembled Ferraris was assessed along three dimensions using a 5-point scale for each dimension and then summed to form a composite quality score for each vehicle. Across all raters, the average total quality scored for a vehicle was 9.02 out of 15 possible points. Each Ferrari was evaluated by two independent raters. The average score intraclass correlation coefficient ($ICC(A,2)$) was equal to .87 for the 43 Ferraris evaluated by

myself and the lab manager. For the 29 Ferraris evaluated by two research assistants *ICC*(*A*,2) was equal to .77.

Specifically, each of the 72 assembled Ferraris was assessed along dimensions of paint quality, cutting/folding quality, and structural integrity. Across all teams and production runs, the three dimensions were relatively distinct from another (i.e., α = .48 for the three items), which is predictable given the sequential assembly process. For example, a car could be perfectly painted but due to time constraints was shoddily assembled. The highest inter-item correlations were between contiguous processes, for example painting and cutting were correlated at r = .20 (*n.s.*) and cutting and assembling were correlated at r = .50 ($p < .01$), but the correlation between the first and last assembly phases (i.e., painting and assembling) was just .03 (*n.s.*).

Additional items asked the extent to which respondents concurred with statements about general and task-specific team performance during the second production shift. These items were adapted from Kirkman & Rosen (1999) and include "my team successfully solved problems that slowed down our work" and "my team avoided wasting inventory." General team performance perceptions were measured with six items (α = .92) and five items assessed task-specific performance (α = .73). Team viability was also assessed with a 5-item measure adapted from Marrone, Tesluk, & Carson (2007). Sample items include "most team members would welcome another opportunity to work as a group" and "most team members found being part of this team to be a satisfying experience" (α = .92).

Individuals on each team also reported motivational states after the first production run (time 1), after the team strategy discussion (time 2), and after the second production run (time 3). Team task commitment and motivation were assessed with five items adapted from

Kirkman & Rosen (1999). Sample statements include "we are all committed to working together" and "we care how well we do on our assignments" (time 1: α = .88; time 2: α = 89; time 3: α = .93).

Individual task efficacy was measured with five items adapted from Edmondson (1999). Sample individual items include "I can meet my responsibilities with reasonable time and energy" and "my abilities are good enough to do my assignment" (time 1: α = .89; time 2: α = .90). Sample team items include "this team can meet its responsibilities with reasonable time and energy" and "this team's abilities are good enough to do our assignment" (time 1: α = .89; time 2: α = .87).

Analyses. Participant explanations for team shortcomings were deconstructed into component parts and the discrete attributions were placed into one of five actor categories: structural obstacles (e.g., time limit), team blame (e.g., poor communication), self-reflection (e.g., my performance), other team members (e.g., he worked slowly), and actor unclear (e.g., wasted materials). Video coding of team interactions was conducted blind to the experimental condition, although dialogue sometimes contained reference to the extent to which a team had underperformed. Regression analyses were conducted to determine the whether the experimental conditions or their interaction predicted the sense-making and team productivity outcomes of interest.

Pilot Study 1 Results and Discussion

Research Question 1. How do the size of the performance deficit and locus of accountability affect individual sense-making of team underperformance?

Table 1 presents an overview of my statistics (Individual Sense-making after [Manipulated] Team Underperformance Feedback). When asked to consider why their team

performed poorly, across all conditions, coded commentary pointed to external factors about half the time and to team processes roughly a third of the time. The team halo effect—whereby team processes are exempted from responsibility for failure and individuals are assigned more responsibility—was not demonstrably present in these initial private appraisals. Very few individuals indicated self-involvement or the actions of specific team members, with the exception of the full accountability condition wherein 11.1 percent of the comments were directed at specific teammate behaviors contributing to failure.

The extent to which a team underperformed exerted a significant effect on individual sense-making about the failure. When asked explicitly to assess team processes that contributed to team outcomes, participants in the severe underperformance condition were significantly more critical than in the slight condition. That is, members of teams that had been told they had severely underperformed felt their team had been handicapped by less supportive behaviors, to include less cooperating, helping, communicating, participating in decision making, and information sharing. Asking why one's team had not succeeded as opposed to why it had failed yielded greater differences, indicating to me that opportunity versus threat framing influences individual sense-making of team failures. Participants in the severe team underperformance condition also reported significantly reduced psychological ownership for their individual responsibilities on the team.

The locus of accountability did not exert discernible effects on individual sense-making and neither did it interact with the extent of the underperformance deficit. My summary interpretation is that the initial individual meaning ascribed to team underperformance depends primarily on how far from adequate the team was. Specifically,

those participants in severely underperforming teams engaged in more team-critical thinking. Although the feedback hit its mark, it also triggered distancing cognitions.

Research Question 2. How do the size of the performance deficit and locus of accountability affect team sense-making of team underperformance? Arguably the most relevant component of team sense-making about underperformance is problem identification. Table 2 (Team Sense-making of Production Run 1 Underperformance) presents detailed results. Severe underperformance did not translate into more extensive collective reasoning about why a team had underperformed and this did not change depending on the locus of accountability. More reasons for underperformance surfaced in the group discussions of teams that had only slightly underperformed. Examining the interaction with accountability indicates this effect is powered by the team-only locus of accountability. In other words, the slightly underperforming teams with a team-only locus of accountability generated far more reasons for underperformance than all other conditions. Individual team member behaviors were also more frequently identified as problematic in the slight underperformance condition paired with team-only accountability, compared to the other conditions. Team discussions were also more enthusiastic and collaborative in the slight underperformance condition and in the team-only condition and discussions were longer.

My interpretation of these results is that the initial benefits of severe underperformance feedback in encouraging critical individual sense-making can fritter away when it is time for public discussion, possibly because of the decrease in psychological ownership for the task and/or a desire to avoid discussing potentially threatening information It seems that severe underperformance may impede collective discussions of problems (especially individual members' shortcomings) and this is unchanged by the locus of

accountability. However, teams that had been told they had slightly underperformed and were assigned a team-only locus of accountability flourished and the "best" team sense-making discussions occurred in this pairing of conditions.

Research Question 3. How do the size of the performance deficit and locus of accountability affect team strategy revision for subsequent performance? A critical element of developing a strategy is coming up with solutions and workarounds to perceived obstacles. The statistical effects of the manipulation on team strategy revision are available in Table 3 (Team Strategy Development for Production Run 2). The effects of the manipulations are broadly the same as on team sense-making in that the most solutions were identified in teams that had been told they had slightly underperformed but only when the locus of accountability was kept at the team level. When slight underperformance was paired with full accountability, the effects were the same as for teams in the severe underperformance condition. Slightly underperforming teams also reorganized role responsibilities and workflow more than teams that received severe underperformance feedback. Teams that had team-only accountability were also more committed to strategy revisions than those with full accountability.

My assessment is that the effects of underperformance and accountability on team strategy development mirror the effects on team sense-making. The optimal condition for a full discussion of how to fix problems occurs when underperformance is perceived as slight and the locus of accountability is limited to team outcomes rather than full accountability.

Research Question 4. How do the size of the performance deficit and locus of accountability affect subsequent performance? Per Table 4, teams that received slight underperformance feedback rather than information indicating a severe deficit trended

toward greater gains in team product quality and also perceived their team performance better both in terms of general processes and task competence (Table 3. Team Performance Production Run 2). Teams with a slight underperformance deficit also showed significant efficiency gains.

Although increasing individual accountability was unhelpful for encouraging collective sense-making and strategy revision, teams in the full accountability condition did outperform teams in the team-only condition in terms of improving the quality of the team product and reducing inefficiencies. These teams also rated their general and task-specific performance on the second production run higher.

Taken together, these results hint at two routes to concrete performance improvements in subsequent team performance following failure. The traditional route, per the social loafing literature, occurs by increasing individual accountability. Under full accountability, it seems that team discussions of failure and strategy revision are bypassed, possibly to avoid uncomfortable discussion because everyone can see what each person is responsible for and how they missed the mark. But armed with information about individual causal responsibility, these teams deliver gains in team quality and efficiency and report higher perceptions of team performance regardless of the size of the underperformance deficit. A novel alternate route occurs via effective collective sense-making when underperformance is slight. Teams overcome limited individual sense-making by means of more thorough and self-critical team discussions of what went wrong and how to fix it, so long as accountability is maintained at the team level.

Pilot Study 2 Methods

Manipulation checks for the first pilot study indicated that the accountability manipulation would benefit from clarification and strengthening. The purpose of the second pilot study was to assess whether a stronger accountability manipulation exerted more visible effects on my key outcome variables. I conducted a review of published accountability manipulations, which directed me to incorporate an expectation of accounting for future performance to a credible external authority into my previously subtle accountability intervention. To isolate the effects of the accountability manipulation, I held underperformance constant across both accountability conditions. I also expanded the coding of team interactions to include adaptive extra-role behaviors of participative leadership and helping intentions and extended the length of the production runs by 25 percent (i.e., to 15 minutes) to allow for more variance in team product.

Participants. I recruited 35 paid participants through the Center for Decision Research in July 2013 to form nine teams of three to four members each. The mean age of this sample was 26.2 years, 39.4 percent were male, and 62.9 percent self-reported as non-white or non-Caucasian. A small number of participants reported having worked with at least one teammate on a previous academic or professional assignment or being personal friends with one or more teammates (15.0 percent and 13.8 percent respectively). 87.9 percent of the sample reported part-time or casual work experience (average of 37.2 months), and 66.7 percent reported full-time work experience (average of 28.6 months).

Procedures. I used the same paper Ferrari assembly task as in the first pilot study but increased the length of each production run from 12 to 15 minutes. After the first production run, a research assistant collected finished and unfinished Ferraris for evaluation. Using the

same mix of actual and predetermined feedback, all teams received team performance feedback indicating that they had slightly underperformed relative to other production teams.

In both accountability conditions, I used computer cues to establish the expectation that after the next production run, the team would meet with an external authority to account for future team performance outcomes. I extended the length of each experimental session by 15 minutes to ensure this expectation was credible.

In the team-only accountability condition, the performance feedback again included only team-level scores. Individuals on those teams then read the following instructions on their computer screen:

> *The Ferrari quality control team has evaluated hundreds of Ferraris produced by teams such as yours over the past year and the lead evaluator is completing a doctorate in evaluations of team performance. Please carefully review the evaluation of your team's performance on the first production run.*
>
> *Following your next production run, the lead Ferrari quality control evaluator will interview your team. During a 10-minute discussion, your team will be asked to fully explain, justify, and defend your team outcomes on the next production run.*

In the full accountability condition, team scores and individual role responsibilities were provided, as in the first pilot study. Individuals in the full accountability condition then read the following instructions on their computer screen:

> *The Ferrari quality control team has evaluated hundreds of Ferraris produced by teams such as yours over the past year and the lead evaluator is completing a doctorate in evaluations of team performance. Please carefully review the evaluation of your team's performance and your individual role performance on the first production run.*
>
> *Following your next production run, the lead Ferrari quality control evaluator will interview your team. During a 10-minute discussion, your team will be asked to fully explain, justify, and defend your team outcomes on the next production run. You will also be called on individually to account for your specific role performance on the second production run.*

Measures. The dependent variables were identical as for the first pilot study, with the exception of extending the video coding protocol to include participative leadership and whether or not team members expressed intentions to help each other or share role responsibilities.

Analyses. The purpose of the second pilot study was to test the effects of a stronger accountability manipulation. Given the results of the first study indicated no direct effect of accountability on initial private sense-making, I focus my attention here on the differential effects of team-only and full accountability on collective sense-making, strategy development, and subsequent performance.

Pilot Study 2 Results and Discussion

One purpose of the second pilot study was to determine whether 15-minute production runs are of sufficient duration to ensure variance in team product. Teams finished between 1 and 3 vehicles on the first production run (M = 1.67) and between 2 and 6 vehicles on the second production run (M = 3.11). Quality of product ranged from 6.50 to 9.67 (M = 7.82) on the first production run and from 6.83 to 12.50 (M = 10.18). Table 5 describes team performance across experimental conditions in greater detail.

Keeping accountability focused only on team responsibility for performance outcomes activated more thorough and reflective team sense-making and strategy development. For example, teams in the team-only accountability condition identified more reasons for their underperformance (M = 3.60 versus M = 2.75 on a 5-point scale) and made more specific references to the feedback information they had received (f = 2.20 versus f = 1.75). The number of solutions voiced in the team-only condition was also greater (f = 5.60 versus f = 4.00) and teams considered more radical role revisions (M = 2.60 versus M = 1.75

on a 3-point scale). All these teams exhibited helping intentions as opposed to only 50 percent in the full accountability condition. The energy exhibited during team discussions was also greater (M = 4.20 versus M = 3.25 on a 5-point scale) and shared leadership emerged in 80 percent of these teams (versus 25 percent in the full accountability condition). These additional findings lend credence to the preliminary findings of the first pilot study, namely that team-only accountability paired with slight underperformance tends to encourage active team discussions of contributing factors to underperformance and the proposal of solutions.

The effects of the accountability condition were also visible in the greater gains in quantity in the product of teams with team-only accountability relative to full accountability (2.00 more Ferraris versus .75 more Ferraris) and greater gains in the efficient use of resources (2.80 less wasted materials versus 1.25 less wasted materials). The gains in team product quality were approximately the same across the two accountability conditions (M = 2.30 versus M = 2.43). These additional findings suggest that so long as underperformance is slight, the ideal locus of accountability is at the level of only the team.

Pilot Study 3 Methods

The accountability manipulation checks in the second pilot study were worded in a way that all participants indicated "yes" to being held accountable for team and individual contributions to the team. My intuition is that the assignment of individual role responsibilities, which occurred for all teams, confounded the accountability manipulation checks. Another reason was likely the limited response format (i.e., "yes" or "no"). I designed a third pilot study to explicitly test the validity of my two accountability manipulations with a more nuanced response format.

Participants. I recruited 66 paid participants for a short on-line survey via MTurk in July 2012. Discarding respondents who completed the survey in under 90 seconds or failed an attention check resulted in 54 usable responses, 26 in the team-only accountability condition and 28 in the full accountability condition. Individuals did not perform a team task and no performance feedback was provided.

Procedures. Participants read an introduction that explained I was studying how members of a team interpret instructions. They then read the same information as the lab participants regarding an assignment to work on a Ferrari production team for two shifts. I changed the length of each production shift from 15 minutes to four hours to increase situational realism. To mimic the previous pilot studies, participants then received a randomly assigned team role and were asked to maintain the perspective of that team member for the remainder of the study. In the team-only accountability condition, participants read the following instructions:

> *Feedback (first page)*
>
> *After each production run, Ferrari quality control will evaluate your team product and provide feedback on the quantity and quality of Ferraris produced by your team.* ***Your team scores will be provided (see example below).*** [Team performance report from previous pilot studies is depicted].
>
> *Interview (second page)*
>
> *When you have completed both production shifts, the lead Ferrari quality control evaluator will then interview your team. During a 10-minute discussion,* ***your team will be asked to fully explain, justify, and defend your team outcomes on your production run.***

In the full accountability condition, participants read the following instructions:

> *Feedback (first page)*
>
> *After each production run, Ferrari quality control will evaluate your team product and provide feedback on the quantity and quality of Ferraris produced by your team.*

Your team scores will be provided (see example below). [Team performance report from previous pilot studies is depicted].

Feedback (second page)

Each member's role performance will be provided (see example below). [Individual performance report from previous pilot studies is depicted].

Interview (third page)

When you have completed both production shifts, the lead Ferrari quality control evaluator will then interview your team. During a 10-minute discussion, ***you will be called on individually to account for your specific role performance. Your team will also be asked to fully explain, justify, and defend your team outcomes on your production run.***

Measures. I assessed the mental representation of the accountability manipulations with two items: "Based on these instructions, to what extent is management focused ... on how your team did? On your individual performance?" Response options ranged from 0 to 100 on a sliding scale. Two additional questions evaluated attentiveness by asking respondents to recall their assigned role and the length of each production shift.

Analyses. I conducted one-way analyses of variance using the accountability condition to predict the extent to which participants reported management focusing on team and individual performance.

Pilot Study 3 Results and Discussion

Results indicate that the accountability manipulations were interpreted as I had intended. First, there was a greater perceived focus on team outcomes in the team-only accountability condition than in the full accountability condition (M = 82.58 versus M = 69.79; F = 6.51, $p < .05$). Second, there was a greater perceived focus on individual performance in the full accountability condition than in the team-only accountability condition (M = 78.18 versus M = 46.31; F = 28.00, $p < .001$). The brevity of the interlude

between instructions and manipulation checks likely enabled these strong differences between conditions. To keep the accountability intervention salient in longer studies, I will include periodic reminders (i.e., "You will be expected to account for your team's performance in addition to your own").

Summary of Pilot Results

My four foundational research questions asked how the extent of underperformance and the accountability locus influences individual sense-making, collective sense-making, collective strategy development, and subsequent performance. The preliminary results of the pilot studies suggest that the severity of team underperformance encourages more pessimistic retrospective individual framing of team processes and less psychological ownership for one's work. The process of team adaption does not appear to improve with the introduction of full accountability. Instead, increasing individual accountability appears to diminish the advantages associated with slight team underperformance feedback on collective team sense-making and strategy development. Interestingly, introducing full accountability may yield gains in team performance despite impeding productive team discussions, possibly because the information is individually retained if not expressed or used in collective discussions.

Changes in individual and team efficacy beliefs followed universal patterns across all experimental conditions, such that team discussions elevated individual and team perceptions of abilities to perform the task well and stayed at this level through the remainder of the team task assignment. My interpretation is that the simple motor nature of the task components (i.e., cutting, coloring, folding, and taping) mooted doubts about individual and collective abilities to perform. I found only small variations in individual and team task commitment, which I attribute to the flat reward structure (i.e., all participants received credit or pay

regardless of outcomes), absence of personal investment in the assignment, and the short lifecycle of each team. Although motivational states are included in my integrated process model in Figure 4, the pilot results indicate I am unlikely to learn much about efficacy and task commitment with my current methodological approach, so my hypothesis development will focus on dependent variables that I can reasonably expect to show variance in my chosen research setting.

Hypothesis Development

In the following section I develop a set of explanations and predictions regarding the effects of the extent of the underperformance deficit and locus of accountability on team responses to underperformance and feedback. I first address the mechanisms activated by the severity of the underperformance deficit and then examine the interactive effects of increasing individual accountability.

Underperformance Deficit

Individual sense-making. Previous research has shown that knowledge of performance outcomes affects individual cognitive recall of group processes and that an individual's implicit theories of group processes are particularly sensitive to negative rather than positive outcome information (Guzzo, Wagner, Maguire, Herr, & Hawley, 1986). Severe underperformance feedback tends to activate less flattering retrospective attributions of group characteristics (Bacharach et al., 2001), for example, when students believe their group was unsuccessful, they retrospectively attribute less cohesiveness, quality of communication, openness to new ideas, motivation levels, ability, role clarity, and satisfaction with the team than when they were led to believe the team had been successful (Staw, 1975).

There are several reasons to expect such pessimistic retrospective framing of team processes. First, we know that individuals tend to weight negative information more heavily (Kahneman & Tversky, 1984) and that more severe negative feedback is a stronger and less ambiguous cue and commands greater attention. Severe underperformance feedback can therefore activate a more acute awareness of and sensitivity to the contributing actions of others on the team. Second, people tend to judge a small effect to have been produced by a small cause needing remediation by a small solution, whereas a large problem is judged to have been caused by major factors needing remediation by strong intervention (Aspinwall & Taylor, 1997). Counterfactual thinking about how underperformance could have been avoided should therefore focus more on what the team did not do right and less on what the team did right and needs to do more of to succeed. Third, post-performance disillusionment should be greater simply because there is a larger contrast between implicit team performance expectations and the outcome feedback (Heath & Jourden, 1997).

In line with these arguments and the evidence from my pilot work and cited empirical studies, I expect individual sense-making about causes of team underperformance will be more positive when the performance feedback is slight and will exhibit more retrospective bias against team processes when feedback is severe:

> *Hypothesis 1. As the team performance deficit increases, individual sense-making processes yield more pessimistic retrospective framing of team processes.*

Individual failure framing involves not only retrospective sense-making of contributory team processes but also an individual cognitive appraisal of what the situation means for the individual. When the facts appear sufficiently negative and clear-cut, people tend to want to withdraw. For example, studies have shown that the greater the performance deficit, the less a team member will stress the importance of success on a task and the greater

the desire for distance from the team (Forsyth & Schlenker, 1977). A primary reason is simply our basic human motive to maintain positive self-regard (Fiske, 2004). Becoming personally involved in a low-control situation is particularly risky because one's behavior is constrained by the actions of others (Jackson & Dutton, 1988). Another reason is that feedback is cognitively appraised for its general harm-benefit potential (Kluger & DeNisi, 1996), and disengagement serves as a way to mentally escape stronger loss expectations, even for someone with high positive self-regard. For these reasons, I expect the extent of the underperformance deficit to not only affect retrospective sense-making about team processes underlying the performance outcomes but also to dampen individual appraisals of task ownership:

> *Hypothesis 2. As the team performance deficit increases, individual sense-making processes activate reductions in individual psychological ownership of responsibilities.*

Team sense-making. This process is different than within-in group similarity of individual sense-making in that individual observations are tested and integrated through discussion, expansion, and accumulation of new insights. This process is a joint effort to sort out the causal factors behind the team's performance outcomes (Klein, Wiggins, & Dominguez, 2010). Team sense-making has to be performed by a team rather than individually, which poses additional coordination requirements. Specifically, through social interaction team members integrate lower-order and potentially divergent information in an effort to identify and converge on higher-order themes and ideas about the reasons for collective underperformance (Rosen et al., 2011; Weick & Roberts, 1993).

My expectation is that as the team performance deficit increases, teams will engage in greater cognitive loafing such that the process of team-level information search will identify fewer causes of underperformance and problem framing will be more restricted. Even though

individuals may notice severely negative feedback more, the team context activates tendencies to repress or blunt this information (Aspinwall & Taylor, 1997). There are several reasons to anticipate that teams receiving severe underperformance feedback will process team feedback less meaningfully and engage in premature closure (Aspinwall & Taylor, 1997; Dahling, Chau, & O'Malley, 2012).

First, when individuals have retrospectively framed team processes such as information sharing, participative decision making, and cooperation as deficient, this perception is likely to feed forward and impede these critical processes when it is time to discuss the root causes behind team underperformance. In other words, implicit individual expectations yield team-fulfilling behaviors that impair conscious engagement and active collective thinking. With less active thinking and engagement when underperformance feedback is severe, team sense-making processes should more narrowly frame the causal factors behind the underperformance feedback.

Furthermore, severe underperformance feedback is likely to activate a different pattern of coping responses because such information is more likely to be interpreted as unfixable rather than easily correctable (Lazarus & Folkman, 1984). As the performance deficit increases, teams are more likely to appraise the feedback as negative and harmful rather than as a positive opportunity to improve performance. When a team appraises a stressful demand as a hindrance—rather than a potentially rewarding challenge—the team tends to engage in more avoidant and escapist coping instead of active problem solving (Pearsall, Ellis, & Stein, 2009). Teams that receive severe underperformance feedback are therefore more likely to cope by disengaging from team interactions.

Instead of actively coping by approaching and intellectualizing the causes of team underperformance, which would enable a team to directly address conflictual issues and approach genuine agreement, teams that receive severe underperformance feedback are likely less interested in acquiring new information or clarifying understanding (Aspinwall & Taylor, 1997). If epistemic motivation, which is the "desire to develop and hold accurate and well-informed conclusions about the world" (De Dreu, Beersma, Stroebe, & Euwem, 2006: 929; Scholten et al., 2007) is lower on these teams, they should instead cope with the severe underperformance feedback by engaging in superficial information sharing about perceived problems. Such teams are also likely to entertain more team-enhancing cognitions, which further impede broad problem identification and synthesis (Jordan & Audia, 2012). This logic leads me to predict the following:

> *Hypothesis 3. As the team performance deficit increases, team sense-making processes will identify fewer causes behind the team's performance.*

Team strategy development. According to Burke and colleagues, team strategy development is the "translation, differentiation, integration, and application of knowledge that allows teams to execute the cognitive and behavioral processes of team adaptation" (2006). Formulating a team action plan involves multiple processes, to include establishing expectations for cooperation through preemptive conflict management (De Dreu & Weingart, 2003; Marks et al., 2001), role differentiation whereby team members set responsibility boundaries within the context of the task (Kozlowski et al., 1999), and deliberate planning and contingency planning (Rosen et al., 2011).

I expect that the extent to which a team has been told it underperformed will differentially affect the number of solutions proposed and the extent to which role responsibilities and workflow are revised, as well as the emergence of collaborative

leadership and helping intentions. Developing a new team strategy is a form of prospective sense-making whereby future-oriented group processes are identified (Stigliani & Ravasi, 2012) and it depends in large part on how the problems have been framed. Teams are likely to invest time, effort, and other resources to solve problems only to the degree that a problem is actually perceived to exist (Hobfoll, 1989). At a very general level, if teams that received severe underperformance feedback narrowly frame the causal factors such that fewer problems are seen to exist, then fewer solutions should be proposed because small problems motivate small and convenient actions. In other words, after framing the situation in a way that permits team-enhancement and avoids perceptions of needing radical changes, changes and risky actions are less likely to be tabled for collective discussion (Jordan & Audia, 2012).

The collective identification of problem solutions is not only hindered by rosy reinterpretations of underperformance. Another contributory factor to team inertia, or the tendency to remain with the status quo and resist exiting the frame of current strategy (Huff, Huff, & Thomas, 1992: 56), stems from appraisals of the controllability of the situation. Narrowly framed problems that are additionally seen as unfixable should further compromise team problem-solving efforts and encourage defeatism (Aspinwall & Taylor, 1997). In light of this reasoning, I expect fewer solutions to emerge in the strategy discussions of teams that received severe underperformance feedback:

> *Hypothesis 4. As the team performance deficit increases, team strategy development will yield fewer problem solutions.*

Discussions of role responsibilities and workflow processes are an integral component of team discussions of possible courses of action when adapting to negative feedback (Gerisck & Hackman, 1990). Planning should include clarifying member roles and responsibilities and reordering inputs (Burke et al., 2006). On the surface, it seems that

severe underperformance feedback should trigger major restructuring and frame-breaking changes (Tushman, Newman, & Romanelli, 1986), particularly when subsequent team success depends on underused individuals backing up team members who are overly taxed. However, despite the ostensible need for innovative responses, I expect teams that receive severe underperformance feedback will prefer stability over adaptation and will therefore make less drastic changes in role responsibilities and workflow. As Gersick & Hackman observe, some groups faced with failure exhibit existing routines more vigorously and patterns of behavior can persist even from the first trial to the second despite an explicit impetus for change (1990). One reason to expect teams that receive severe underperformance feedback to reorganize less is that revising responsibilities requires purposefully examining member resources, skills, abilities, and knowledge (Kozlowski et al., 1999), and as I previously argued, teams that receive severe underperformance feedback are motivated to think and act less critically. Personnel changes that focus on repositioning team members are especially unlikely because those changes suggest that certain individual members are deficient, which has the potential to create conflict (Johnson, Hollenbeck, DeRue, Barnes, & Jundt, 2013).

Extra-role behaviors such as offering to help teammates or participating in leading the unit are positive and discretionary and of considerable value in dynamic environments when all team member behaviors cannot be specified in advance (Van Dyne & LePine, 1998). However, when teams are provided with severe underperformance feedback, team members are less likely to step out of proscribed roles by offering to help teammates with their own responsibilities and are also less likely to participate in leading the team. One reason is that adhering to existing routines protects groups from having to address affectively negative

issues pertaining to the team. On teams given severe underperformance feedback, suggesting changes in individual responsibilities or stepping into a leadership role may be anticipated to be seen as undermining colleagues' capabilities or making a play for power rather than as promotive or affiliative behaviors (Gersick & Hackman, 1990; Van Dyne, Cummings, & McLean Parks, 1995). A secondary reason to expect teams that receive severe underperformance feedback to prefer to maintain in-role behaviors relates to psychological ownership. Empirical work has demonstrated that psychological ownership is positively related to extra-role behavior (Vandewalle, Van Dyne, & Kostova, 1995). If individual sense-making of severe underperformance reduces psychological ownership, then extra-role behaviors should also be reduced.

Based on the preceding arguments, I predict that the extent of the underperformance deficit impacts team strategy development in the following additional ways:

> *Hypothesis 5a. As the team performance deficit increases, team strategy development will yield smaller revisions in role responsibilities and workflow.*
>
> *Hypothesis 5b. As the team performance deficit increases, team strategy development will contain fewer offers of extra-role helping.*
>
> *Hypothesis 5c. As the team performance deficit increases, participation in leadership during team strategy development will decrease.*

Accountability Structure

There are several reasons to expect that increasing individual accountability on severely underperforming teams should boost the adaptivity of team sense-making and strategy development processes (see left graph in Figure 5. Interactive Effects of Accountability on Team Responses to Underperformance Feedback). Social loafing should be reduced when team members believe their contributions to the collective product are identifiable and have a standard against which to compare their individual performance

(Karau & Williams, 1993). Introducing full accountability should also be of instrumental value because it gives recipients a better idea of the causes and consequences of team underperformance and suggests how they can make improvements. Furthermore, accountability affects not only what we think but how we think. Holding individuals accountable on severely underperforming teams should spur deep information processing and the development of an accurate and multifaceted understanding of the causes of underperformance during team sense-making discussions (Lerner & Tetlock, 1999; Scholten et al., 2007). Accountability stimulates group members to stay alert and question procedures as well as objectives, which should encourage consideration of more revisions in team strategy (Kroon et al., 1992). At the same time, full accountability should curtail self-enhancement due to identifiability, evaluation expectancy, and a focus on one's weaknesses (Sedikides et al., 2002).

However, my expectation is that when outcomes are universally negative, introducing full accountability for outcomes inhibits adaptive team sense-making and strategy development processes rather than boosting them (graphically depicted on the right side of Figure 5). Full accountability deliberately removes a buffer between team performance and personal responsibility and thus increases pressure on each individual. Being able to minutely compare performance levels or see how one's efforts are instrumental to achieving team outcomes may generally encourage more self-reflection and self-criticism during restrospective sense-making discussions (Morris & Moore, 2000), but when members are concerned about competency, attempts to heighten responsibility can backfire. Increased cognitive vigilance and self-diagnosticity can activate self-oriented responses that include a desire to avoid punishment and to deflect pressures (Frink et al., 2008; Simonson & Staw,

1992) rather than activate team-oriented responses that focus on clarifying processes and expectations. In other words, when underperformance is present, full accountability impairs focusing on faulty team processes by introducing distracting concerns about personal culpability and vulnerability (Aspinwall & Taylor, 1997). Introducing full accountability to an underperforming team is therefore likely to activate more convergent, pessimistic, and defensive sense-making at both the individual and team levels. This interaction implies that increasing individual accountability will not boost severely underperforming teams and will instead erode the adaptive advantages of slight underperformance feedback:

> *Hypothesis 6. Individual sense-making on slightly underperforming teams with full accountability will yield more pessimistic retrospective framing of team processes relative to slightly underperforming teams with team accountability.*
>
> *Hypothesis 7. Individual sense-making processes on slightly underperforming teams with full accountability will activate reductions in individual psychological ownership of responsibilities relative to slightly underperforming teams with team accountability.*
>
> *Hypothesis 8. Team sense-making processes on slightly underperforming teams with full accountability will identify fewer causes behind the team's performance relative to slightly underperforming teams with team accountability.*
>
> *Hypothesis 9. Team strategy development will yield fewer problem solutions in slightly underperforming teams with full accountability relative to slightly underperforming teams with team accountability.*

Clarifying individual performance to outcome expectancies has also been argued to depress collective goodwill, erode lateral trust, and reduce the value assigned to collective payoffs (De Cremer & Van Dijk, 2002; Sewell, 1998). To maintain unity and the social integrity of the team, hard-nosed discussions of individual shortcomings that involve social comparisons will therefore be avoided on underperforming teams with full accountability in favor of more ambiguous discussions of what went wrong and potential solutions. In contrast, keeping accountability at the team level should stimulate active participation of

group members and extra-role behaviors because that structure emphasizes the connectivity of team activities; responsibility for possible failure is evenly distributed, which should increase eagerness to exert influences on decision making (Kroon et al., 1992). In other words, keeping the locus of accountability at the team level should encourage more role-making as opposed to narrow role-taking (Frink et al., 2008). For these reasons, I predict:

> *Hypothesis 10a. Team strategy development will yield smaller revisions in role responsibilities and workflow on slightly underperforming teams with full accountability relative to slightly underperforming teams with team accountability.*
>
> *Hypothesis 10b. Team strategy development will contain fewer offers of extra-role helping on slightly underperforming teams with full accountability relative to slightly underperforming teams with team accountability.*
>
> *Hypothesis 10c. Participation in leadership during team strategy development will decrease on slightly underperforming teams with full accountability relative to slightly underperforming teams with team accountability.*

Performance Improvements

The outcome of the discussed retrospective and prospective processes of sense-making and strategy development is to enact the selected strategy and perform. Functional adaption is said to occur when the team is maintained or grows (Burke et al., 2006). Teams that are more adaptive should show greater improvements relative to previous performance. This performance can be captured along several dimensions, to include the quality and quantity of team output as well as how efficiently resources are used.

Based on my arguments regarding the restrictive and shallow nature of their sense-making and strategy development processes, I expect teams receiving severe underperformance feedback to exhibit fewer gains in team performance and that this effect will not be ameliorated by introducing full accountability. Instead, I predict that the teams with the steepest gains in team performance will be those who received slight underperformance feedback and for whom accountability was kept at the team level:

H11: As the team performance deficit increases and accountability increases, subsequent performance improvements will be smaller as measured by changes in team (a) product quantity and (b) and efficient use of resources.

CHAPTER 4. METHODOLOGY

Design

The study used a between-subjects design. There were two independent variables: underperformance deficit (with two levels: slight or severe) and accountability structure (with two levels: team-only or full, in which individual accountability was also present). The dependent variables related to individual sense-making were collected at the individual level. The dependent variables related to team sense-making and strategy development were collected via video recording at the team level. Team performance was assessed at the level of the team by counting team production quantity and wasted inventory as well as by aggregating individual reports of perceived team effectiveness.

Participants

I recruited 167 paid participants through the Center for Decision Research for a 75-minute laboratory session during September 2013. Participants were randomly assigned to teams of three or four members each. The mean age of this sample was 21.8 years, 35.9 percent were male, and 36.8 percent self-reported as non-white or non-Caucasian. A small number of participants reported having worked with at least one teammate on a previous academic or professional assignment or being personal friends with one or more teammates (9.6 percent and 13.8 percent respectively). 87.4 percent of the sample reported part-time or casual work experience (average of 25.5 months) and 52.1 percent reported full-time work experience (average of 10.2 months).

Procedure

The team assignment was to manufacture paper Ferraris during two 15-minute production runs that required sequential collaboration. As explained in the second chapter, I selected this type of task because effective team performance required a high level of interdependency but the workflow also allowed the ostensible isolation of individual contributions for the full accountability manipulation. Newly formed teams were used for convenience and also because teams starting from scratch on a new task would have no prior performance expectations or existing teamwork strategies which could weaken the believability of the underperformance manipulations.

On each team, individual members were randomly assigned to a specific role responsibility (i.e., cutting out the vehicle body, applying paint, folding to prepare the body for assembly, and assembling the vehicle with tape or glue). Skill differentiation and authority differentiation were both low (Hollenbeck et al., 2012). Roles did not require any specialized knowledge or functional abilities and decision-making responsibility was vested in the team as a whole rather than in a designated team leader.

After the first production run, a research assistant collected finished and unfinished Ferraris for counting and evaluation in a separate location. Teams received hardcopy performance feedback on their first Ferrari production run, reported individual sense-making about the team's performance while sitting at private computer stations, and then had up to seven minutes for a videotaped group discussion of what went well and what went poorly as well as what (if anything) to change going forward. After filling out a team planning document and individually reporting on commitment to the team and its strategic plan, the team reunited for a second Ferrari production run.

Experimental Manipulations

The experimental manipulations of severity of underperformance and outcome accountability occurred after the teams finished their first production run. A research assistant collected the finished and unfinished vehicles in a box marked "Quality Control" and took them to a separate area for quality inspection. Teams earned points for each completed Ferrari and lost points for wasted resources and a predetermined number of quality control failures (six for each team). The team performance feedback document included a list of 16 quality control dimensions but did not identify which 6 had been problematic.

The underperformance feedback manipulation consisted of randomly categorizing actual observable team product as being slightly or severely below average in comparison with other similar production teams. During the experimental session, the evaluators added the number of cars a team had finished and left incomplete, but the remainder of the report had already been filled out to indicate that team performance was in the 47th percentile or the 17th percentile. To ensure that the deficit was attended to, in addition to providing each member of a team with an identical hardcopy performance report, the performance ranking was accompanied by a graphical distribution marked with an arrow and a number (e.g., "-3") in red ink that drew attention to how far below the mean the team had performed.

Locus of accountability was manipulated at two levels and fully crossed with the two levels of underperformance. In both accountability conditions, computer cues established the expectation that after the next production run, the team would meet with an external authority to account for future team performance outcomes.

Individuals in the team-only accountability condition received team performance evaluations and then read the following instructions on their computer screen:

> *The Ferrari quality control team has evaluated hundreds of Ferraris produced by teams such as yours over the past year and the lead evaluator is completing a doctorate in evaluations of team performance. Please carefully review the evaluation of your team's performance on the first production run.*
>
> *Following your next production run, the lead Ferrari quality control evaluator will interview your team. During a 10-minute discussion, your team will be asked to fully explain, justify, and defend your team outcomes on the next production run.*

Individuals in the full accountability condition received team performance evaluations as well as a breakdown of the 16 quality control issues into individual role responsibilities. The feedback on how well an individual performed his role was based in part on actual observable quantitative performance (e.g., "number of cars painted" or "number of cars assembled") but the information on relative individual performance was in the same predetermined underperformance range as the team. Individuals in the full accountability condition then read the following instructions on their computer screen:

> *The Ferrari quality control team has evaluated hundreds of Ferraris produced by teams such as yours over the past year and the lead evaluator is completing a doctorate in evaluations of team performance. Please carefully review the evaluation of your team's performance and your individual role performance on the first production run.*
>
> *Following your next production run, the lead Ferrari quality control evaluator will interview your team. During a 10-minute discussion, your team will be asked to fully explain, justify, and defend your team outcomes on the next production run. You will also be called on individually to account for your specific role performance on the second production run.*

To reinforce accountability expectations, participants received two reminders about the post-production interview. I included one reminder at the end of the individual sense-making questionnaire participants submitted prior to the team discussion. The second reminder was given at the end of the post-discussion questionnaire, immediately prior to the

start of the second production run. At the conclusion of the experiment, participants received information that the planned interview would not take place due to the lead quality control evaluator's work commitments.

Suspicion and Manipulation Checks

Participants reported what they thought was the purpose of the study prior to receiving a debriefing on the research questions and random assignment of relative performance feedback. Seven of 167 participants mentioned underperformance as a possible study topic and seven responded "yes" when asked whether team performance on the first production shift had been above average. One additional participant was suspicious about the post-production interview.

In addition to the suspicion check for the accountability intervention, I also included an accountability locus check by asking participants to evaluate the extent to which management was focused on how well the team did using a scale of zero to 100. Participants in the team-only accountability condition indicated that management was significantly more focused on how their team did (95% CI, 64.09–76.50) compared to those in the full accountability condition (95% CI, 46.21–56.70).

I examined the pattern of inattentive or suspicious participants and elected to exclude from my study the two teams in which more than one member had failed a manipulation check or had discerned one of the study manipulations. I also excluded the remaining suspicious or inattentive participants from individual-level analyses but retained them for all team-level analyses. These choices resulted in a sample size of 149 for the individual-level analyses. This sample did not differ discernibly from the original 167 in terms of demographic characteristics or familiarity with team members or work experience. Table 6

reports the distribution of these 149 individuals and the remaining 43 teams by experimental condition.

Measures

Unless noted otherwise, self-report measures are on 7-point scales where 1 = "strongly disagree" and 7 = "strongly agree." The only individual-level measures are for individual sense-making measures. All other items were either collected at the level of the team or aggregated to the team level based on both theoretical and statistical justification.

Individual sense-making. Individuals responded to a series of 9 statements about the team and its functioning as a group, where "1 = not at all" and "7 = very much" (adapted from Campion et al., 1993). Individuals also reported the extent to which they felt a sense of psychological ownership for their work using five items adapted from Van Dyne & Pierce (2004); sample items include the extent to which participants felt "attached to the results of your work" and "a sense of ownership for the vehicles you work on." Cronbach's alpha (α) for this scale is .90.

Team sense-making and strategy development. These team processes were assessed by observational coding of recorded team discussions. Video of sufficient quality for coding was acquired for 38 teams. In addition to myself, two independent coders evaluated each team video and all three coders discussed their ratings to reach 100 percent agreement on the problems teams identified (*f*), solutions discussed (*f*), and the occurrence of extra-role helping intentions (Y/N) and presence of participative leadership (Y/N). Ratings of the two continuous variables were averaged across coders. The variables include the extent to which a team revised role responsibilities (1 = "left the same" to 3 = "each member changed

responsibilities," average *ICC(A,3)* = .77) and the workflow (1 = "left the same" to 3 = "radical revision," average *ICC(A,3)* = .62).

Although not hypothesized to relate to the independent variables, I wanted to be able to describe team enthusiasm during the team discussion and subsequent commitment to the team performance and its planned revisions so that I could alleviate potential concerns of using a sample of primarily college students to test my hypotheses. I used behavioral coding of the level of team energy (1 = "apathetic," 7 = "enthusiastic," average *ICC(A,3)* = .83) and measured team commitment to the revised strategy with four individually reported items that were aggregated to the team level (*ICC(1)* = .16; *ICC(2)* = .39; $rwg_{(j)}$ = .92; α = .85). Sample statements include "I endorse our plan going forward" and "most members of my team appear enthusiastic about how we intend to work together." General team task commitment and motivation following the team sense-making and strategy discussion were assessed at the individual level with five items adapted from Kirkman & Rosen (1999), which were aggregated to the team level. Sample statements include "this team wants to do a good job" and "all of us want to be involved in improving our performance" (*ICC(1)* = .22; *ICC(2)* = .50; $rwg_{(j)}$ = .95; α = .92).

Team performance. Both finished and unfinished Ferraris were collected at the end of each production run for counting and quality evaluations. Inefficiencies were measured by counting wasted resources, i.e., the materials used for Ferraris that were not fully assembled by the end of a production run. Additional items asked the extent to which respondents concurred with statements about general and task-specific team performance during the second production shift. General team performance perceptions were measured with six items (*ICC(1)* = .40; *ICC(2)* = .69; $rwg_{(j)}$ = .88; α = .85). These items were adapted from

Kirkman & Rosen (1999) and include “my team successfully solved problems that slowed down our work” and “my team avoided wasting inventory”. Two additional items assessed task-specific performance by asking the extent to which team members thought their team “created attractive Ferraris” and “carefully assembled Ferraris” (*ICC(1)* = .32; *ICC(2)* = .62; $rwg_{(j)}$ = .71; α = .70).

CHAPTER 5. RESULTS

Across Conditions

Overall, individuals perceived team performance to be driven equally by hard work, information sharing, cooperating, interacting positively, helping each other as needed, knowing what to expect, communicating clearly, participating in decision making, and taking the task seriously. Team size correlated significantly with three perceptions of team performance factors such that smaller teams were more positive about members working equally hard, cooperating, and knowing what to expect. Table 7 reports the means, standard deviations, and correlations of the individual sense-making variables.

Across all teams, the average team discussion yielded half as many reasons for underperformance as possible solutions, indicating a preference to focus on prospective versus retrospective sense-making. In approximately three out of four teams, all individuals offered to help teammates going forward and in nine out of ten teams, all members participated in leading the team. Team size was not significantly correlated with any of the team sense-making and strategy development variables. Table 8 presents descriptive statistics for the team sense-making and strategy development variables.

On average, teams produced twice as many Ferraris on the second production run as on the first and reduced the amount of wasted materials by more than half. As reported in Table 9 (Descriptive Statistics for Team Performance Variables), team size did not correlate significantly with team performance outcomes and the average team perceived its

performance on the second production run to be highly effective in terms of both group processes and specific task effectiveness.

Main Effect of Performance Deficit

Individual sense-making. Hypothesis 1 stated that as the team performance deficit increases, individual sense-making processes yield more pessimistic retrospective framing of team processes. To test this prediction, I conducted a two-way mixed-effects Analysis of Variance (ANOVA) on each of the nine perceived performance factors with severity as a fixed effect and team as a random effect in which participants were nested[1]. Statistical results of the ANOVA are included in Table 10 and cell means are reported in Table 11.

The main effect of underperformance severity was statistically significant in the hypothesized direction for eight of the nine items measuring individual framing of team processes: increasing the severity of the feedback yielded more pessimistic retrospective assessments of teammates having worked equally hard, having shared information, having cooperated with each other to get work done, having had positive social interactions with each other, having communicated with each other clearly, and having participated in decision making. The difference between slight and severe negative feedback conditions approached significance for individual recollections of how seriously teammates took the task. Based on these results, Hypothesis 1 was supported.

Hypothesis 2 predicted that as the team performance deficit increases, individual psychological ownership of responsibilities decreases. The same mixed-effects nested ANOVA procedure was used to test for significance. This hypothesis was not supported; the

[1] UNIANOVA DV BY TEAM SEVERITY
/RANDOM = TEAM
/METHOD=SSTYPE(3)
/DESIGN=SEVERITY TEAM(SEVERITY).

differences in mean psychological ownership were nonsignificant across the two underperformance conditions. Statistical results of the ANOVA are included in Table 10 and cell means are reported in Table 11.

Team sense-making and strategy development. Hypothesis 3 predicted that as the team performance deficit increases, team sense-making processes will identify fewer causes behind the team's performance. After determining that the frequency count of underperformance causes follows a normal distribution, I conducted a one-way ANOVA with severity as a fixed effect on the frequency of problems raised during the team discussion. The main effect of underperformance severity was nonsignificant ($F_{(1,36)} < 2$), indicating that teams identified a similar number of possible failure causes in both the slight and severe underperformance conditions. Based on these results, Hypothesis 3 was not supported.

Hypothesis 4 predicted that as the team performance deficit increases, team strategy development will yield fewer problem solutions. Means and standard deviations for the count of problem solutions mentioned during team discussion are presented in Table 8. A one-way ANOVA with severity as a fixed effect was used to test for significant differences in the number of problem solutions mentioned during team discussion. The results of the ANOVA indicate a lack of differences between conditions and therefore do not support Hypothesis 4 ($F_{(1,36)} < 2$).

Hypothesis 5 stated that as the performance deficit increases, (a) team strategy development will yield smaller revisions in role responsibilities and workflow, (b) team strategy development contain fewer offers of extra-role helping, and (c) participation in leadership during team strategy develop will decrease. Cell means and standard deviations

for these dependent variables are shown in Table 12. I conducted several one-way ANOVAs with severity as a fixed effect to test for significant differences. The main effect of underperformance was significant but in the opposite direction I predicted, such that the worse a team had been told it performed, the greater its revisions in workflow ($F_{(1,36)} = 10.64$, $p < .01$) and revisions in role responsibilities ($F_{(1,36)} = 3.16$, $p < .08$) and also the greater occurrence of extra-role helping intentions ($F_{(1,36)} = 7.57$, $p < .01$). There was no effect of underperformance on whether or not team members participated in leading the team (Hypothesis 5c). Based on these results, Hypothesis 5 was not supported.

Interaction of Performance Deficit with Accountability

Hypotheses 6 through 10 predicted that introducing full accountability serves to stifle adaptive responses in slightly underperforming teams rather than boost them in severely underperforming teams. Figure 5 is repeated here to show the proposed interactive effects of accountability on responses to underperformance feedback.

Individual sense-making. Hypothesis 6 stated that individual sense-making processes on slightly underperforming teams with full accountability will yield more pessimistic retrospective framing of team processes relative to slightly underperforming teams with team accountability. Hypothesis 7 stated that individual sense-making processes on slightly underperforming teams with full accountability will activate reductions in psychological ownership relative to slightly underperforming teams with team accountability. Means and standard deviations for these dependent variables by each experimental condition are shown in Table 11.

To test these two hypotheses, I used a series of planned orthogonal contrasts to compare the cell mean of the slight underperformance and team accountability condition to

the other cells that were hypothesized to be lower. Significance levels for each contrast are reported in Table 11. Plots of the cell means for significant contrasts and those trending toward significance are provided in Figure 6. These plots visually indicate how introducing full accountability to slightly underperforming teams results in significantly less positive recollections of four team processes: information sharing ($p < .02$), cooperation ($p < .01$), social interactions ($p < .01$), and helping each other ($p < .01$). Individual interpretations of two team processes trend toward significance: individual perceptions of communication clarity ($p < .11$) and participation in decision making ($p < .10$). The contrasts of individual perceptions of how seriously members took the task, worked equally hard, knew what was expected of them, and psychological ownership for individual responsibilities were statistically nonsignificant. Therefore the results provide partial support for Hypothesis 6 and do not support Hypothesis 7.

Team sense-making and strategy development. I predicted a similarly repressive effective of full accountability on team sense-making and strategy development, such that slightly underperforming teams with full accountability would identify fewer causes behind the team's performance (Hypothesis 8), fewer solutions (Hypothesis 9), smaller revisions in role responsibilities and workflow (Hypothesis 10a), fewer offers of extra-role helping (Hypothesis 10b), and reduced participation in leadership (Hypothesis 10c). I tested the inhibitory effect of full accountability on slightly underperforming teams through a series planned orthogonal contrasts. Table 12 reports the cell means, standard deviations, and tests of the statistical significance of each planned contrast.

Plots of the cell means for significant contrasts and those trending toward significance are shown in Figure 7. These plots display how introducing full accountability to slightly

underperforming teams results in fewer discussions of the causes of team performance ($p <$ .12), more minor revisions in role responsibilities ($p < .001$) and work sequencing ($p < .001$), and less expression of extra-role helping intentions ($p < .02$) and participation in team leadership ($p < .09$). The results provide some support for Hypothesis 8 regarding the extent to which performance causes are identified, do not support Hypothesis 9 regarding the number of solutions identified, and do support Hypothesis 10 regarding the role revisions, workflow adjustments, helping intentions, and participation in team leadership.

Subsequent Team Performance Improvements

Hypothesis 11 stated that as the performance deficit and accountability increase, performance improvements will be smaller as measured by changes in team product quantity and the efficient use of resources. Table 13 reports the cell means and standard deviations by experimental condition for the first production run. Table 14 reports the same information for the second production run, along with perceived team performance outcomes. Across the study and also within each condition, none of these outcome values exceeded the threshold to be considered a statistical outlier.

I tested Hypothesis 11 with a repeated measures ANOVA of the interactive effects of severity and accountability on changes in team performance from the first production run (time 1) to the second production run (time two)[2]. The three-way interaction approached significance for both changes in the number of Ferraris produced and the reduction in wasted materials. Table 15 presents the statistical results these ANOVAs. Perceptions of team

[2] GLM DVTIME1 DVTIME2 BY SEVERITY ACCOUNT
/WSFACTOR=TIME 2 Polynomial
/MEASURE=DV
/METHOD=SSTYPE(3)
/WSDESIGN=TIME
/DESIGN=ACCOUNT SEVERITY ACCOUNT*SEVERITY.

performance were measured only after the second production run and the interaction between accountability and underperformance was not statistically significant for perceived task effectiveness or for perceived team process effectiveness.

Figure 8 displays plots of the marginal means of observed team performance variables for the first and second production runs. The plots of completed Ferraris indicate that under conditions of slight team underperformance, gains in productivity are steeper with team-only accountability, but under conditions of severe underperformance, gains in productivity are steeper with full accountability. The plots of wasted resources indicate that under conditions of slight team underperformance, reductions in waste are steeper with team-only accountability, but under conditions of severe underperformance, reductions in waste are steeper with full accountability. The results partially support Hypothesis 10 in that performance improvements are smaller with greater accountability, but this relationship holds only for slightly underperforming teams and not those that received severe underperformance feedback.

Supplementary Analyses

To address possible concerns regarding the focus and dedication of a primarily student-based sample, I examined the extent to which teams displayed enthusiasm during the team discussions and attitudes regarding their revised task strategy and general commitment to doing a good job. Displayed enthusiasm was moderate during the sense-making and strategy development discussions (M = 3.40, SD = .69; 1 to 5 scale) and commitment to the planned changes and doing well in general were quite high (respectively M = 6.09, SD = .55 and M = 6.60, SD = .50; 1 to 7 scale). I used a multivariate ANOVA with these three attitudinal outcomes as a set of dependent variables to ensure differences were minimal

across experimental conditions. A trend emerged for the effect of the accountability manipulation ($F_{(3,33)} = 2.25$, $p < .10$). A visual inspection of cell means indicated that teams in the full accountability conditions were marginally less enthusiastic ($M = 3.30$, $SD = .61$), less committed to strategy changes ($M = 5.91$, $SD = .58$), and less committed to doing a good job ($M = 6.04$, $SD = .63$).

Results Summary

Individuals working on teams that received severe negative feedback are less positive in how they interpret team processes driving performance. Compared to individuals in teams that received slight team underperformance feedback, these team members are more critical of whether members worked equally hard during the first production run, shared information, cooperated to get work done, interacted positively, communicated clearly, participated in decision making, and took the team production task seriously. Teams in the severe negative feedback condition, compared to teams in the slightly negative feedback condition, are more likely to rethink their role responsibilities and radically rearrange their workflow and are more likely to offer to help each other going forward.

The extent of the purported performance deficit acts in tandem with the accountability structure to influence how individuals make sense of team processes contributing to team performance outcomes. Both the introduction of greater individual accountability and giving a team severe underperformance feedback yields more critical retrospective evaluations of team processes contributing to the performance outcome. Implementing full accountability expectations inhibits team discussion of the causes of failure on slightly underperforming teams and also yields more minor revisions in individual roles and workflow patterns, as well as dampens offers of extra role helping and participation in leading the team.

CHAPTER 6: DISCUSSION

Teams and performance feedback are both fundamental elements of organizational life, but the ways in which work teams make sense of and adapt to underperformance feedback remains underexplored in prevailing management theories. In particular, we have yet to fully develop an understanding of why it is that teams tend respond to the need for change by selecting and implementing suboptimal strategies. As I noted at the beginning of this dissertation, these gaps in our knowledge are in large part attributable to the lack of attention paid to team transition points, although understanding what actually transpires between performance episodes is critical to explaining when and how teams decide on adaptive changes.

This research endeavor contributes to reducing explanatory inadequacies by examining how newly formed teams respond to change cues differently depending on both the intensity of the underperformance deficit and whether accountability expectations are linked to team-only behaviors or to those that also include individual contributions. Compared to team research where independent variables and team performance variables are measured with little understanding of the intervening team processes, I deliberately attempted to open the "black box." By analyzing video recordings of the interactive processes of dozens of novice teams, my research develops a more nuanced description of how teams make sense of initial failure feedback and develop adaptation strategies. My studies demonstrate that certain combinations of feedback intensity and accountability are more likely to encourage

deeper discussions of how best to revise team work processes and drive steeper improvements in team performance.

A key finding of my research was that when teams are new at a task, severe negative feedback is a greater catalyst for team adaptation than is slight negative feedback. Individuals on teams that experienced severe outcome feedback were significantly more analytic about team processes contributing to team performance outcomes. These teams were subsequently observed planning more radical revisions in their workflow and role responsibilities and offering to step outside their roles to help each other going forward.

My results are consistent with previous work indicating that knowledge of team performance outcomes affects individual cognitive recall of group processes and that negative team performance feedback in particular activates more pessimistic retrospective attributions of group characteristics such as quality of communication, team member ability, and role clarity (Bacharach et al., 2001; Guzzo et al., 1986; Staw, 1975). I found evidence that severe negative feedback is a stronger and less ambiguous signal that commands greater attention by individuals on the team than slight underperformance feedback and that team members indeed view small effects to have been produced by small causes and large problems to be caused by bigger factors (Aspinwall & Taylor, 1997; Kahneman & Tversky, 1984). My results indicate that people do think as hard as the situation requires.

Failure framing involves not only retrospective sense-making of contributory team processes but also an individual's appraisal of what the situation means for the self. I had argued that greater underperformance feedback would activate a desire for distance from the team (Forsyth & Schlenker, 1977; Snyder et al., 1986) to maintain positive self-regard (Fiske, 2004) and to avoid involvement in a situation where one's behavior is constrained by

the actions of others (Jackson & Dutton, 1988). I had expected that individual psychological ownership of responsibilities would therefore diminish as the team performance deficit grew. However, it appears that ownership perceptions are at least initially stable for individuals working collectively on a new task and are robust to feedback negativity. My assessment is that these results are consistent with previous work demonstrating that providing feedback to individuals in teams dilutes its intensity (Latané et al., 1979; Leary & Forsyth, 1989). These results also complement studies indicating that team membership serves to buffer individuals from emotional reactions to feedback (Heath & Jourden, 1997). It seems therefore that at the level of the individual, severe negative feedback encourages greater acuity in private individual assessments of team processes and that being part of a team can neutralize individual disengagement tendencies.

Sense-making in response to negative team feedback is not a solitary process grounded in individual observations and judgments but is fundamentally a social construction (Weick, 1995: 40). Through social interactions, team members integrate lower-order and potentially divergent information in an effort to identify and converge on higher-order themes and ideas about the reasons for collective underperformance (Rosen et al., 2011; Weick & Roberts, 1993). I had expected that as the team performance deficit increased, teams would engage in greater cognitive loafing such that the process of team-level information searching would identify fewer causes of and solutions to underperformance. My reasoning was that once individuals perceived communication, information sharing, and cooperative processes as deficient, they would be less likely to engage in active collective thinking. Furthermore, previous work has demonstrated that teams tend to engage in more

avoidant and escapist coping instead of active problem solving when a stressful demand is appraised as a hindrance (Pearsall et al., 2009).

What I found was that the average number of failure causes and solutions teams identified did not vary across underperformance conditions. It seems that when a team underperforms, team conversation about the causes of failure is neglected in favor of discussing positive changes going forward. The universal preference for prospective over retrospective sense-making could be due to the complexity of counterfactual thinking about the different causal links in collective performance (Lindsley et al., 1995; Naquin & Tynan, 2003) or could result from overriding preferences—no matter the size of the performance deficit—to avoid awkward encounters or outright conflict by suppressing forthright commentary about why a team underperformed. The future-oriented focus of team conversation could also be because team sense-making processes dealing with first-time failure unconsciously gravitate toward reframing undesirable situations in terms of prospective success opportunities.

Although the number of problems and solutions identified across the two underperformance conditions are comparable, there are notable differences in planned execution strategies. I had expected that teams that received severe underperformance feedback would be motivated to think and act less critically as a collective, and therefore I had predicted that they would opt for stability over adaption by avoiding purposefully examining member resources, skills, abilities, and knowledge and by keeping existing routines (Gersick & Hackman, 1990; Kozlowski et al., 1999). Instead, my results demonstrate that newly formed teams that received severe underperformance feedback

decided to enact greater revisions in team member roles and work sequencing and exhibited helping intentions more frequently.

These behaviors are consistent with research arguing that major restructuring and frame-breaking changes in routines are more likely when cues for change are strong (Aspinwall & Taylor, 1997, Gersick & Hackman, 1990, Tushma et al., 1986). Personnel changes that focus on repositioning team members are generally avoided because they suggest that certain individual members are deficient and have the potential to create conflict (Johnson et al., 2013), but my findings suggest that severe team feedback opens the door to revising role responsibilities and offering extra-role help without these choices being seen as undermining colleagues' capabilities or making a play for power (Gersick & Hackman, 1990; Van Dyne et al., 1995). My interpretation is that newly formed teams view the situation as needing to be fixed and also fixable.

It seems that severe negative feedback can push teams to adapt in a way the slight negative feedback does not. First, severe negative feedback triggers more critical individual evaluations of why the team performed at the stated level. Greater pessimism in retrospective framing of team processes did not appear to incur an immediate cost in terms of psychological task ownership and these teams displayed greater flexibility in expanding or switching individual role responsibilities and overhauling the workflow. Discretionary behaviors are of considerable value in dynamic environments when all team member behaviors cannot be specified in advance (Van Dyne & LePine, 1998), and the teams that received severe underperformance feedback were observed offering to provide extra-role help to teammates more frequently. Taken together, these findings suggest that newly formed teams are more inclined to interpret outcome feedback as a wake-up call for action when the

feedback indicates a severe performance gap and are more inclined toward complacency when the feedback indicates a narrow miss.

A second key finding was that introducing full accountability to slightly underperforming teams does seem to get individuals to think more critically about team processes. However, these private thoughts are not aired during team discussion and instead inhibit the identification of possible causes of underperformance and yield more conservative changes in how work is carried out and by whom and with whose help. Observed performance improvements in terms of team product quantity and efficiencies are larger in the slight underperformance condition when accountability is kept at the team level.

Research on individual motivation in group settings consistently points to the importance of holding people answerable for their decisions and actions (Miles & Greenberg, 1993; Sedikides et al., 2002; Williams et al., 1989). My results qualify these findings by showing that increasing individual accountability has different effects depending on the underperformance level of the team. Full accountability deliberately removes a buffer between team performance and personal responsibility that increases the pressure on each individual. When the team only slightly underperformed, the result of full accountability is inhibitory. Although individuals in this situation have more information and are more critical about the team processes leading to the performance outcomes than when accountability is directed exclusively at the team level, in team discussions they identify fewer causes of team underperformance, offer less extra-role helping, settle on more incremental changes in role assignments and work sequencing, and are less likely to have broad participation in leading the team. Performance gains and efficiency improvements are also smaller when full accountability is paired with slight team underperformance.

My interpretation is that when underperformance is slight rather than severe, unambiguously linking individual performance to outcome expectancies appears to do the team a disservice, I presume because the need for intense individual accountability is not readily apparent after a mild initial failure. My findings are therefore consistent with work arguing that when accountability is perceived as unnecessary or excessive, it can inadvertently encourage conformity and limit role-making and organizational citizenship behaviors (Brehm, 1966; De Cremer & Van Dijk, 2002; Frink, et al., 2008; Morris & Moore, 2000; Sewell, 1998; Simonson & Staw, 1992). In contrast, I found that full accountability does help teams that received severe underperformance feedback to improve their collective performance, presumably because teams more clearly see the need for and value of linking individual contributions to team outcomes.

Many of these findings converge with those of my pilot testing but some do not and deserve additional explanation. First, the effect of negative feedback on individual sense-making was highly consistent (i.e., across my series of studies, team members on teams that were told they severely underperformed reported more critical retrospective assessments of the adequacy of team processes). Similarly, in each study I found that introducing full accountability to teams that had just slightly underperformed inhibited reasoning about the causes of failure and potential solutions and curtailed radical revisions in responsibilities and workflow. What was not consistent between the pilot studies and dissertation study was the effect of negative performance on team sense-making and strategy development.

At first glance, the divergence in findings might appear to be attributable to faulty findings in the pilot studies due to the small sample and measurement error. The full dissertation study involved more than twice as many teams and the team discussions were

observed and coded by multiple raters rather than just myself. However, the consistency in all other results suggests that sample size and measurement precision are not the issue.

Reexamining the data on team sense-making and strategy development leads me to conclude that the reversal in findings is due to strengthening the accountability manipulation for the dissertation study. Introducing a much stronger expectation of being held accountable to an external authority appears to have elevated the efforts of teams that had been told they severely underperformed, regardless of the locus of accountability. For example, compared to the pilot studies with less effective accountability manipulations, those in the dissertation study identified on average approximately one more reason for failure and three more potential solutions. So although slightly underperforming teams with team accountability still engaged in deeper sense-making and strategy development than those with full accountability, severely underperforming teams redoubled their efforts and surpassed them.

Limitations

The present study focuses on the effects of the underperformance deficit and accountability structure on the micro-processes that occur during the transition period between two team performance episodes. My chosen research methodology enabled me to eliminate alternate interpretations of the results by holding team size, tenure, task, selection, and reward structure constant. The study design allowed me to exercise control over the timing and content of the underperformance feedback, to obtain objective and equivalent measures of team performance, and also permitted recording of team sense-making, all of which would have been extremely difficult in a field setting due to privacy and timing concerns. Despite its strengths, however, my study design limits the generalizability of the results in several important ways.

First, teams in this study design experienced failure once rather than repeatedly and the cost of failure was low; all participants earned the same compensation for their time. It seems reasonable to anticipate that repeated negative performance (Lindsley et al., 1995) or perceptions of individual performance inequities (Barr & Conlon, 1994; Saavedera & Kwun, 1993) would elicit different patterns of failure framing and attempts at resolution based on categorizing the team feedback as a challenge or hindrance (Pearsall et al., 2009). This could especially be the case when valued outcomes are at stake and intragroup trust is low (Peterson & Behfar, 2003) or when the team reward structure fosters competition over cooperation or is misaligned with the locus of accountability (Beersma et al., 2009; Pearsall et al., 2008). In this study the extrinsic stakes for success or failure were deliberately kept to a minimum, but raising the stakes for performance outcomes would likely introduce individual concerns about justice, which has been shown to influence team sense-making features (Roberson, 2006).

A second design limitation is that this investigation used newly formed teams, which means team initial development was occurring at the same time that the teams were making sense of their underperformance feedback. The implication of this study feature is that my findings regarding the effects of the performance feedback on team sense-making and strategy development are intertwined with more spontaneous adjustments associated with regular team growth. I suspect that teams with more history together might be more or less inflexible depending on their performance trajectory, their orientation toward feedback and learning (Dahling et al., 2012), and levels of psychological safety (Edmondson, 1999), which are likely influenced by the greater feedback environment in a particular organization (Rosen, Levy, & Hall, 2006). Size was also held constant, but larger teams probably benefit

more from increasing individual accountability than would small teams (Karau & Williams, 1993).

A third design limitation is that the team outcome variables of interest were restricted in range. Giving teams 15 minutes for each production run was advisable for practical reasons related to participant recruitment and compensation but also resulted in somewhat arbitrarily capping team performance. Relaxing the tight time constrictions on this task or assigning a team task with a broader array of team performance outcomes should allow more nuanced conclusions about the effects of underperformance on team adaptation.

Additionally, this study design used informally self-managed teams and measured critical mass in leadership participation as an outcome variable—i.e., leadership in teams rather than of teams (Day, Gronn, & Salas, 2006)—but having a formally appointed team leader has been demonstrated to improve information sharing behaviors and help teams converge on an accurate mental model of team performance drivers (Randall et al., 2011). The underlying mechanisms by which team leadership influences team performance and performance outcomes are not yet fully understood, but the suggestion has been made that team member perceptions of accountability may explain the effects of leaders on team behaviors (Burke et al., 2006). If this is the case, then both the accountability interventions in this study may have served as a type of leadership substitute. In any case, a formally appointed leader within or external to the team could be expected to help the team set goals, develop positive team norms, decide on a work performance strategy, and assist the team in developing a shared understanding of performance drivers (Morgeson, De Rue, & Karam, 2010).

Finally, underperformance is continuous variable but was treated as a fixed effect with two levels. Similarly, outcome accountability was held to two representative levels when more variations occur in organizations (Bergsteiner, 2012). The results therefore speak to the effects of a greater performance deficit or more individual accountability on the dependent variables of interest but cannot be generalized to other levels between or beyond those chosen for this study.

Suggestions for Future Research

Focusing in detail on the activities of teams during a transition period between performance episodes served to answer my foundational research questions about incipient team sense-making in response to initial failure feedback and permitted me to identify several precursors to functional changes in team strategy and drivers of performance outcomes. This study followed most of the principles of studying team adaptive processes suggested by Rosen and colleagues (2011), to include capturing bottom-up changes in team performance, capturing top-down changes in strategy, capturing a team's recognition of a need for change, capturing a team's ability to self-assess, and capturing what team members are thinking and feeling in a dynamic matter. However, the study did not capture a profile of team adaptation over time and held constant several potential explanatory variables. Future work should remedy these shortcomings to extend the generalizability of the findings.

There are several logical approaches to expanding this research stream. First, future work could delve deeper into the details of the team transition stage, for example by explicitly examining the links between problems, solutions, and task execution or by identifying the teams with the greatest performance gains following failure feedback and retrospectively assessing the dynamics in those team sense-making discussions.

A different approach would be to take a broader perspective. This could be done by shifting the focus to study teams that have more experience working together or that are approaching the end of their lifecycle. In an experimental setting, simply extending the lifecycle of a team by adding an additional performance episode would help build our understanding of how more developed performance expectations influence team sense-making and strategy development. It would also enable us to better understand when adaptation plateaus, for example, after implementing all readily available changes a team might begin to coast despite its best intentions. I also initially simplified my study design by holding individual performance feedback at the same level of the team, but this simplification could be relaxed to examine how high and low individual performers respond differently to collective underperformance feedback.

A third approach to extending these findings would be to study additional moderators, such as the type of task assignment, team characteristics related to learning and feedback orientation, and critical elements of the organizational context such as externally imposed leadership and reward structures. Some team task assignments might be simple and have clearly visible means of improvement whereas others might be perceived as more challenging or ambiguous and it would be worthwhile to understand how team responses differ between conditions. Another particularly relevant moderator would be the length of the task. It could well be that short-term tasks lend themselves to adaptation more readily than those that are longer term or indefinite and therefore more overwhelming. Or it could be that longer term tasks are exactly the ones for which teams see more value in expending energy on adaptation. As for the leadership structure, an external leader could prove to be a useful scapegoat for continued underperformance or an actual constraint on teams initiating changes

but could also prove an invaluable resource in guiding team efforts toward functional adaptive strategies. The type of leadership in place is therefore another interesting venue for future research.

In the laboratory setting there was little opportunity to build a strong sense of psychological safety, yet the emergence of psychological safety could prove to be a particularly powerful moderator of the accountability manipulations. Specifically, teams with high psychological safety might benefit tremendously from full accountability because it clarifies the link between individual behaviors and outcomes. In contrast, teams without psychological safety might respond to the increased accountabilities by engaging in greater defensive or avoidant coping. The moderator effect of psychological safety could not be tested in my research approach, but examining when psychological safety enables or hinders team adaptation represents an avenue for further investigation in a field environment.

Although I demonstrated that the severity of the underperformance deficit and the accountability structure influence individual and team sense-making and strategy development in response to negative team feedback, the causal chain of events remains to be determined. There is good reason to believe that individual sense-making upwardly influences team discussion features and that revisions in team strategy will impact team productivity. Future work could more closely investigate the links between these processes.

Finally, the array of team performance outcomes could be expanded to include other performance indicators of interest. Future research could move beyond indices of production quantity and efficiency to examine task-relevant outcomes such as the quality, innovativeness, or riskiness of the team product, all of which I suspect are encouraged or

discouraged by the accountability structure in place and extent of the team's previous underperformance.

Practical Implications

Fostering effective team adaptation is essential to the functioning and viability of organizations (Burke et al., 2006). The results of my research suggest that sugar-coating severe underperformance feedback is not necessary for newly formed teams and that explicit, informative, and timely feedback on team outcomes can be interpreted as a catalyst for revising work processes. In business teams, sports teams, academic teams, and many other team situations, team performance improvement depends on helping teams fully appreciate the magnitude of their underperformance. In my studies, slight underperformance was defined as just below average compared to a reference group. Teams that were told they were slightly below the mark made only minor changes. In an organizational setting outside the laboratory environment, these minor revisions might take teams from slightly below average to average. For leaders who want to take their teams from "good to great," however, team performance improvement may require reframing feedback in those situations to emphasize the sizeable gap between slightly below average and excellence.

The teams I studied appear to unconsciously prefer to avoid delving into the causes of team underperformance and naturally gravitate toward pinning underperformance on external causes such as resource constraints. This leads me to suggest that managers highlight the value of teams tying solutions to specific problems. In leaderless groups, it may be particularly valuable to establish the norm of collectively reviewing performance between episodes to make sense of underperformance drivers and to collectively devise revised task strategies. Implementing formal after-action reviews may be helpful in establishing the norm

of structured reflection (DeRue, Nahrgang, Hollenbeck, & Workman, 2012), but if they are conducted in a way that introduces defensiveness about individual contributions they may backfire by incentivizing a team to reframe the situation more positively than warranted or to attribute problems to an obvious cause rather than more nuanced secondary factors, which require volunteering and exchanging self-implicating information. Framing such a session as an opportunity for team-level discussion of what went awry and what to change going forward appears to sufficiently motivate individuals to contribute helpful suggestions and to work together to improve team effectiveness, so long as the need for revisions are readily apparent and accountabilities are kept to the team level if underperformance is slight.

My studies serve to caution managers to avoid introducing individual accountabilities when they are neither necessary nor effective. Increasing individual accountability does not universally drive team adaption. This is not to say low individual performers should be left to their own devices but rather that linking individual contributions to outcomes in a team setting is a double-edged sword and should be used with careful consideration of the costs to team dynamics.

Conclusion

These findings broaden our understanding of when and why critical changes do not occur following failures in interdependent contexts. My investigation leads me to conclude that teams do appear to make sense of and act on underperformance feedback differently based on the extent of the performance deficit and whether accountability for outcomes extends to individuals or rests at the level of the team. When a newly formed team slightly underperforms, outcome feedback is likely to be superficially digested with no real impetus for strategy revision. Frame-breaking changes in how a team carries out its work are most

likely to occur naturally in teams that feel they have nothing to lose. Furthermore, accountability is not a cure-all for turning around underperforming teams and can instead hold back teams that slightly underperformed from maximizing their potential. These conclusions contribute to the field of organizational behavior by deepening our knowledge of team adaptation in response to failure, by explicating the differential effects of slight and severe underperformance feedback on team processes and outcomes, and by placing an important boundary on the benefits of increasing individual accountability in highly interdependent contexts.

TABLE 1. Individual Sense-making after (Manipulated) Team Underperformance Feedback

Dependent Variables		Underperformance			Accountability			UxA
		Slight	*Severe*		*Team*	*Team & All*		
		n =30	n =31	*p* <	n = 26	n = 35	*p* <	*p* <
1.0	**Target of open-ended failure attributions**							
		f = 37	*f = 36*		*f* = 46	*f* = 27	$X^2(3) = 7.19$, p < .07	
1.1	Structural factors (external to team)	54.05%	52.78%		52.17%	55.56%		
1.2	Team processes (we)	40.54%	36.11%		79.17%	33.33%	t(71) = 3.90, p < .001	
1.3	Team member (you)	5.41%	0.08%		none	11.11%		
1.4	Self (me)	none	0.03%		0.04%	none		
2.0	**Contributing factors to team shortcomings**[1]							
	Team members generally:							
2.1	Did less than their fair share of work	4.97	4.35	0.31	2.51	2.35	0.73	0.93
2.2	Withheld information	4.87	3.42	0.72	1.94	2.04	0.78	0.70
2.3	Avoided cooperating to get work done	5.37	4.06	0.29	2.26	2.19	0.93	0.67
2.4	Had negative social interaction with a teammate	5.20	4.16	0.01	1.29	1.65	0.04	0.33
2.5	Did not help a teammate out when needed	5.43	3.16	0.00	2.77	2.77	0.80	0.12
2.6	Were confused about what was expected of them	4.87	5.03	0.01	2.66	3.19	0.28	0.61
2.7	Failed to clearly communicate with each other	4.60	3.84	0.63	3.03	3.23	0.65	0.93
2.8	Did not contribute to our decision making	4.77	3.48	0.94	2.80	2.81	0.98	0.67
2.9	Did not take our team task seriously	4.53	4.19	0.43	2.74	3.04	0.52	0.08

[1] *Each item: 1 = not at all, 7 = very much*

[2] *For 4-person teams: Rating of each individual's contribution to team performance on scale of 0 to 100.*

[3] *5-item scale: 1 = strongly disagree, 7 = strongly agree.*

TABLE 1 Continued.

Dependent Variables		Underperformance			Accountability			UxA
		Slight	*Severe*		*Team*	*Team & All*		
		n =30	n =31	*p* <	n = 26	n = 35	*p* <	*p* <
3.0	**Contributing factors to team successes**[1]							
	Team members generally:							
3.1	Worked equally hard on our task	4.97	4.35	0.23	4.57	4.77	0.74	0.43
3.2	Shared information	4.87	3.42	0.00	4.09	4.19	0.98	0.77
3.3	Cooperated with each other to get work done	5.37	4.06	0.00	4.69	4.73	0.88	0.58
3.4	Had positive social interactions with each other	5.20	4.16	0.02	5.00	4.23	0.05	0.45
3.5	Helped each other out when needed	5.43	3.16	0.00	4.34	4.19	0.44	0.65
3.6	Knew what was expected of them	4.87	5.03	0.77	5.03	4.85	0.70	0.73
3.7	Communicated with each other clearly	4.60	3.84	0.06	4.34	4.04	0.37	0.83
3.8	Participated in our decision making	4.77	3.48	0.01	4.06	4.19	0.94	0.77
3.9	Took our team task seriously	4.53	4.19	0.39	4.54	4.12	0.30	0.99
4.0	**Perceptions of contribution to team performance**[2]							
4.1	Cutter	68.23	72.87	0.44	74.69	65.08	0.05	0.55
4.2	Painter	62.17	65.16	0.64	66.09	60.46	0.34	0.93
4.3	Assembler	55.37	58.13	0.58	56.66	56.92	0.93	0.44
5.0	**Psychological sense of ownership**[2]	3.75	2.77	0.00	3.31	3.17	0.50	0.37
6.0	**Individual task efficacy**[3]	5.63	5.46	0.83	5.15	6.07	0.00	0.40

[1] *Each item: 1 = not at all, 7 = very much*

[2] *For 4-person teams: Rating of each individual's contribution to team performance on scale of 0 to 100.*

[3] *5-item scale: 1 = strongly disagree, 7 = strongly agree.*

TABLE 2. Team Sense-making of Production Run 1 Underperformance

Dependent Variables		Underperformance			Accountability			U x A
		Slight	*Severe*		*Team*	*Team & All*		
		8 teams	8 teams	$p<$	9 teams	7 teams	$p<$	$p<$
1.0	**Problem identification**[1]	3.88	2.88	0.05	3.67	3.00	0.11	0.05
2.0	**Targets of blame**[2]							
2.1	Solution focus	1.00	1.00	-	1.00	1.00	-	-
2.2	Blame focus	0.00	0.00	-	0.00	0.00	-	-
2.3	Process focus	1.00	0.88	0.46	0.89	1.00	0.46	0.46
2.4	Individual fingerpointing	0.25	0.00	0.11	0.22	0.00	0.11	0.11
2.5	Self implication	0.38	0.63	0.30	0.67	0.29	0.18	0.11
3.0	**Energy of discussion**							
3.1	Energy[3]	3.38	2.50	0.06	3.22	2.57	0.10	0.28
3.2	Friction[4]	4.00	3.63	0.32	4.00	3.57	0.21	0.16
4.0	**Length of discussion in minutes**	5.50	4.10	0.14	5.11	4.40	0.36	0.70
5.0	**Participation**[2]							
5.1	All and even contribution	0.75	0.75	0.95	0.78	0.71	0.80	0.80
5.2	Dominated by one member	0.00	0.13	0.46	0.11	0.00	0.46	0.46
5.3	Faultline/subset active	0.25	0.12	0.51	0.22	0.14	0.66	0.66
5.4	Silent member (or brief comment)	0.13	0.25	0.53	0.11	0.29	0.40	0.79

[1] *Coding: 1 = no mention of reasons for failure, 5 = full blown discussion*

[2] *Coding: 1 = yes, 0 = no*

[3] *Coding: 1 = apathetic, 5 = enthusiastic*

[4] *Coding: 1= combative, 5 = collaborative*

TABLE 3. Team Strategy Development for Production Run 2

Dependent Variables		Underperformance			Accountability			U x A
		Slight	*Severe*		*Team*	*Team & All*		
		8 teams	8 teams	$p<$	9 teams	7 teams	$p<$	$p<$
1.0	**Number of solutions offered**	5.25	3.50	0.02	4.44	4.29	0.58	0.09
2.0	**Goal setting**[1]							
2.1	Quantity goals for run 2	1.00	0.75	0.16	0.89	0.86	0.71	0.71
2.2	Quality goals for run 2	0.00	0.38	0.09	0.22	0.14	0.87	0.87
2.3	Waste reductions goals for run 2	0.50	0.50	0.90	0.33	0.71	0.18	0.67
3.0	**Reorganization**							
3.1	Role responsibilities[3]	2.25	1.88	0.14	2.00	2.14	0.66	0.66
3.2	Work flow[2]	2.37	1.88	0.07	2.11	2.14	0.92	0.36
3.3	Two item scale (α = .93)	2.31	1.88	0.09	2.06	2.14	0.87	0.47
4.0	**Commitment to revised team strategy**[4]	5.32	5.60	0.62	5.70	5.15	0.04	0.34

[1] Coding: 1 = yes, 0 = no

[2] Coding: 1 = left the same, 2 = some revision, 3 = radical revision

[3] Coding: 1 = none, 2 = some shifting, 3 = everyone has different responsbilities

[4] 4-item scale: 1 = strongly agree, 7 = strongly disagree

TABLE 4. Team Performance on Production Run 2

Dependent Variables		Underperformance			Accountability			U x A
		Slight	*Severe*		*Team*	*Team & All*		
		6-8 teams	7-8 teams	$p <$	7-9 teams	6-7 teams	$p <$	$p <$
1.0	**Quality of team product**[1]							
1.1	Run 2	3.12	3.12	1.00	3.22	2.98	0.31	0.25
1.2	Run 2 - Run 1	0.39	0.10	0.46	0.02	0.48	0.22	0.70
2.0	**Quantity of team product**[2]							
2.1	Run 2	2.75	3.13	0.63	3.11	2.71	0.70	0.44
2.2	Run 2 - Run 1	1.38	1.88	0.48	1.78	1.43	0.65	0.95
3.0	**Efficiency**[3]							
3.1	Run 2 wasted resources	0.63	1.88	0.13	1.67	0.71	0.20	0.10
3.2	Run 2 - Run 1 wasted resources	-3.25	0.25	0.02	-0.44	-2.86	0.11	1.00
4.0	**Team perceived performace**[4]							
4.1	General	5.53	5.06	0.52	5.05	5.60	0.32	0.21
4.2	Task-specific	5.40	5.00	0.47	5.06	5.38	0.51	0.34

[1] *Coding: Composite of three quality components, scale from 1 to 5*

[2] *Coding: Number of finished Ferraris*

[3] *Coding: Number of incomplete Ferraris*

[4] *7-item scales: 1 = strongly agree, 7 = strongly disagree*

TABLE 5. Descriptive Statistics for Team Performance in Pilot Study 2

Team Performance	Range	Min	Max	Mean	SD
1.0 Quality of team product[1]					
Run1	3.17	6.50	9.67	7.82	1.16
Run2	5.67	6.83	12.50	10.18	1.88
2.0 Quantity of team product[2]					
Run1	2	1	3	1.67	0.87
Run2	4	2	6	3.11	1.36
3.0 Inefficiency[3]					
Run1	3	2	5	2.89	1.05
Run2	2	0	2	0.78	0.83

[1] *Coding: Composite of three quality components, scale from 1 to 5*
[2] *Coding: Number of finished Ferraris*
[3] *Coding: Number of incomplete Ferraris*

TABLE 6. Individuals and Teams by Experimental Condition

Individuals			
	Accountability		
	Team Only	Full	
Slight Underperformance	38	35	73
Severe Underperformance	45	31	76
	83	66	N = 149
Teams	Accountability		
	Team Only	Full	
Slight Underperformance	11	10	21
Severe Underperformance	13	9	22
	24	19	N = 43

TABLE 7. Descriptive Statistics for Individual Sense-making Variables

		M	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.	Team Size (0 = 3 persons, 1 = 4 persons)															
2.	Severity (0 = slight, 1 = severe)															
3.	Accountability (0 = team, 1 = full)															
	Perceived team performance factors:															
4.	Worked equally hard.	5.39	1.47	-.31**	-.06	-.03	–									
5.	Shared information.	5.15	1.74	.01	-.05	-.06	.36**	–								
6.	Cooperated.	5.55	1.50	-.19*	-.12	.00	.55**	.72**	–							
7.	Positive social interactions.	5.49	1.63	.00	-.03	.01	.31**	.71**	.63**	–						
8.	Helped each other out.	4.99	1.92	-.10	-.11	-.11	.51**	.55**	.64**	.55**	–					
9.	Knew what was expected.	4.92	1.60	-.21*	-.08	.07	.30**	.32**	.32**	.16	.18*	–				
10.	Communicated clearly.	5.03	1.67	-.02	-.09	.01	.34**	.79**	.75**	.72**	.66**	.26**	–			
11.	Decision making.	4.81	1.77	.01	-.06	-.04	.49**	.74**	.66**	.62**	.60**	.28**	.73**	–		
12.	Took our task seriously.	5.44	1.33	-.10	.03	-.04	.47**	.18*	.27**	.13	.21*	.31**	.11	.25**	–	
13.	Psychological ownership	3.92	1.47	-.07	.06	-.11	.16	.09	.20*	.07	.08	.06	.14	.15	.14	–
14.	Task interdependence	6.24	1.00	.00	.01	-.05	.04	.06	.13	.01	.06	-.07	.07	.10	.10	.10

N = 149, **p < .01 level, *p < .05 level.

TABLE 8. Descriptive Statistics for Team Sense-making & Strategy Development Variables

		M	*SD*	1.	2.		3.	4.	5.		6.		7.		8.
1.	Team Size (0 = 3 persons, 1 = 4 persons)														
2.	Severity (0 = slight, 1 = severe)														
3.	Accountability (0 = team, 1 = full)														
4.	Performance causes[1]	3.32	1.74	.08	.21		.02	–							
5.	Solutions[1]	6.66	1.53	.02	.05		-.08	.12	–						
6.	Role revisions[2]	1.90	.48	-.13	.28		-.29	.07	.21		–				
7.	Workflow revisions[2]	1.93	.32	-.10	.48	**	-.19	.06	.09		.66	**	–		
8.	Helping offered[3]	.77	.43	-.07	.41	**	-.10	.17	.28		.59	**	.60	**	–
9.	Leadership participation[3]	.92	.27	-.18	.09		-.12	-.06	-.20		.14		.14		.30

N = 38-43 teams, ***p* < .01 level, **p* < .05 level.

[1] count of distinct items, [2] 3-point scale, [3] 0 = no, 1 = yes.

TABLE 9. Descriptive Statistics for Team Performance Variables

		M	*SD*	1.	2.	3.	4.		5.		6.	7.		8.	
1.	Team Size (0 = 3 persons, 1 = 4 persons)			–											
2.	Severity (0 = slight, 1 = severe)			.01	–										
3.	Accountability (0 = team, 1 = full)			.03	-.07	–									
4.	Ferraris completed Time 1	1.26	.95	-.16	.17	-.04	–								
5.	Ferraris completed Time 2	2.60	1.28	.09	.06	.06	.18		–						
6.	Wasted materials Time 1	3.81	1.87	.16	-.05	-.11	.00		.26		–				
7.	Wasted materials Time 2	1.44	2.03	.06	.12	-.10	.45	**	-.51	**	.07	–			
8.	Perceived group effectiveness Time 2	5.63	.73	.10	.01	-.11	.21		.58	**	.06	-.28		–	
9.	Perceived task effectiveness Time 2	5.33	.90	.09	-.27	.13	-.18		.36	*	.01	-.54	**	.46	**

N = 43 teams, ***p* < .01 level, **p* < .05 level.

TABLE 10. Results of Analyses of Variance of Individual Sense-making Variables

Dependent Variables	Independent Variables	*df*	*F*	*p* <
Worked equally hard.	Team(Severity)	41,106	1.82	.01
	Severity	*1,41*	*.19*	*.66*
Shared information.	Team(Severity)	41,106	3.90	.00
	Severity	*1,41*	*.01*	*.92*
Cooperated.	Team(Severity)	41,106	2.33	.00
	Severity	*1,41*	*.96*	*.33*
Positive social interactions.	Team(Severity)	41,106	6.06	.00
	Severity	*1,41*	*.01*	*.94*
Helped each other out.	Team(Severity)	41,106	3.33	.00
	Severity	*1,41*	*.66*	*.42*
Knew what was expected.	Team(Severity)	41,106	.87	.69
	Severity	*1,41*	*.77*	*.38*
Communicated clearly.	Team(Severity)	41,106	3.84	.00
	Severity	*1,41*	*.38*	*.54*
Decision making.	Team(Severity)	41,106	2.57	.00
	Severity	*1,41*	*.16*	*.69*
Took our task seriously.	Team(Severity)	41,106	1.41	.09
	Severity	*1,41*	*.47*	*.50*
Psychological ownership	Team(Severity)	41,106	.82	.77
	Severity	*1,41*	*.97*	*.33*

N = 149 individuals in 43 teams; *p* -values adjusted via Greenhouse-Geisser.

TABLE 11. Cell Means and Planned Contrasts for Individual Sense-making Variables

	Slight Underperformance & Team Accountability		Slight Underperformance & Full Accountability		Severe Underperformance & Team Accountability		Severe Underperformance & Full Accountability		Significance of Planned Contrast
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	*p* <
Perceived team performance factors:									
Worked equally hard.	5.59	.22	5.48	.23	5.42	.20	5.40	.25	*n.s.*
Shared information.	5.62	.21	4.65	.22	5.01	.20	5.27	.24	.02
Cooperated.	5.96	.21	5.34	.19	5.53	.22	5.59	.24	.01
Positive social interactions.	5.71	.17	5.23	.18	5.37	.16	5.56	.19	.01
Helped each other out.	5.56	.24	4.78	.26	4.97	.23	4.62	.28	.01
Knew what was expected.	5.08	.27	5.10	.28	4.72	.25	5.07	.30	*n.s.*
Communicated clearly.	5.34	.21	4.92	.22	4.78	.19	5.06	.23	.11
Decision making.	5.14	.24	4.60	.26	4.68	.23	4.79	.27	.10
Took our task seriously.	5.43	.21	5.34	.22	5.58	.19	5.54	.23	*n.s.*
Psychological ownership	4.09	.25	4.09	.23	3.52	.26	3.99	.28	*n.s.*
N = 149.									

TABLE 12. Cell Means and Planned Contrasts for Team Sense-making & Strategy Development Variables

	Slight Underperformance & Team Accountability		Slight Underperformance & Full Accountability		Severe Underperformance & Team Accountability		Severe Underperformance & Full Accountability		Significance of Planned Contrast
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	*p* <
Performance causes	3.30	0.54	2.56	0.57	3.27	0.52	4.25	0.61	.12
Solutions	6.80	0.50	6.33	0.53	6.73	0.48	6.75	0.56	*n.s.*
Role revisions	1.97	0.14	1.54	0.15	2.08	0.14	1.98	0.14	.01
Workflow revisions	1.88	0.09	1.67	0.09	2.08	0.08	2.08	0.10	.00
Helping offered	0.70	0.12	0.44	0.13	0.91	0.12	1.00	0.09	.02
Leadership participation	1.00	0.09	0.78	0.09	0.91	0.81	1.00	0.10	.09
N = 38 teams.									

TABLE 13. Production Run 1 Team Performance Outcomes by Condition

	Ferraris Completed		**Wasted Materials**	
	Accountability		Accountability	
	Team Only	Full	Team Only	Full
Slight Underperformance	*Min* = 0 *Max* = 2 *M* = 1.00 *SD* = .63	*Min* = 0 *Max* = 2 *M* = 1.20 *SD* = .92	*Min* = 1 *Max* = 12 *M* = 4.45 *SD* = 2.88	*Min* = 2 *Max* = 6 *M* = 3.30 *SD* = 1.42
Severe Underperformance	*Min* = 0 *Max* = 5 *M* = 1.54 *SD* = 1.39	*Min* = 1 *Max* = 2 *M* = 1.22 *SD* = .44	*Min* = 1 *Max* = 6 *M* = 3.62 *SD* = 1.45	*Min* = 2 *Max* = 6 *M* = 3.89 *SD* = 1.27

TABLE 14. Production Run 2 Team Performance Outcomes by Condition

	Ferraris Completed		**Wasted Materials**	
	Accountability		Accountability	
	Team Only	Full	Team Only	Full
Slight Underperformance	*Min* = 1 *Max* = 4 *M* = 2.73 *SD* = 1.19	*Min* = 0 *Max* = 4 *M* = 2.30 *SD* = 1.25	*Min* = 0 *Max* = 2 *M* = 1.00 *SD* = .78	*Min* = 0 *Max* = 4 *M* = 1.40 *SD* = 1.43
Severe Underperformance	*Min* = 0 *Max* = 5 *M* = 2.38 *SD* = 1.61	*Min* = 2 *Max* = 4 *M* = 3.11 *SD* = .78	*Min* = 0 *Max* = 12 *M* = 2.15 *SD* = 3.26	*Min* = 0 *Max* = 3 *M* = 1.00 *SD* = 1.12

	Group Effectiveness		**Task Effectiveness**	
	Accountability		Accountability	
	Team Only	Full	Team Only	Full
Slight Underperformance	*Min* = 5.38 *Max* = 6.44 *M* = 5.86 *SD* = .37	*Min* = 3.39 *Max* = 6.46 *M* = 5.3528 *SD* = 1.08	*Min* = 4.50 *Max* = 6.50 *M* = 5.59 *SD* = .52	*Min* = 4.50 *Max* = 6.33 *M* = 5.55 *SD* = .75
Severe Underperformance	*Min* = 4.38 *Max* = 6.78 *M* = 5.57 *SD* = .70	*Min* = 4.88 *Max* = 6.71 *M* = 5.74 *SD* = .58	*Min* = 2.13 *Max* = 6.25 *M* = 4.91 *SD* = 1.11	*Min* = 3.00 *Max* = 6.25 *M* = 5.36 *SD* = 1.01

TABLE 15. Results of Analyses of Variance of Team Effectiveness

Dependent Variables	Independent Variables	*df*	*F*	*p* <
Ferraris Produced	Time	1,39	39.97	.00
	Time x Accountability	1,39	.22	*n.s.*
	Time x Severity	1,39	.01	*n.s.*
	Time x Accountability x Severity	1,39	3.60	.07
Wasted Materials	Time	1,39	36.20	.00
	Time x Accountability	1,39	.01	*n.s.*
	Time x Severity	1,39	.39	*n.s.*
	Time x Accountability x Severity	1,39	3.42	.07

Note. N = 43 teams. Time 1 = first production run, time 2 = second production run.

FIGURE 1. Process Model of Response to Feedback

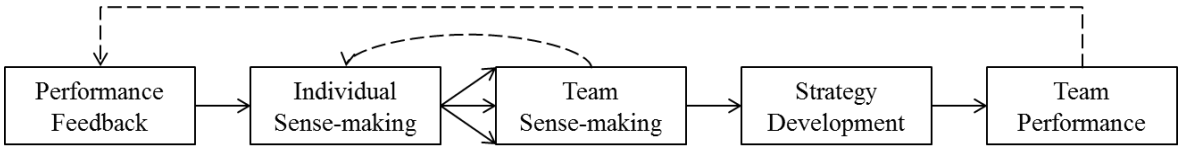


FIGURE 2. Process Model of an Accountability Episode

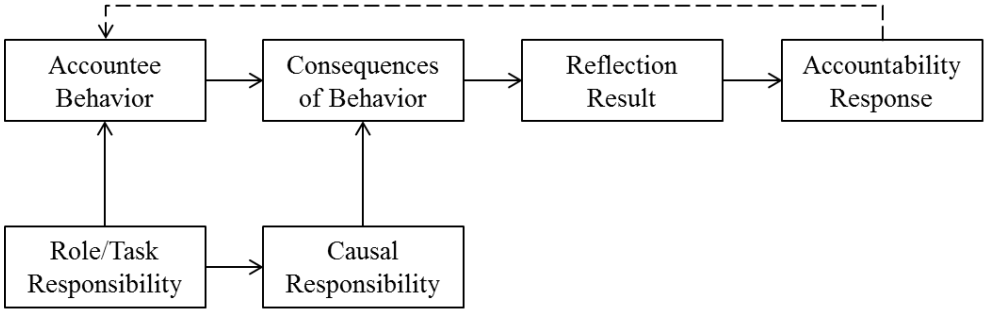


FIGURE 3. Loci of Team Accountability

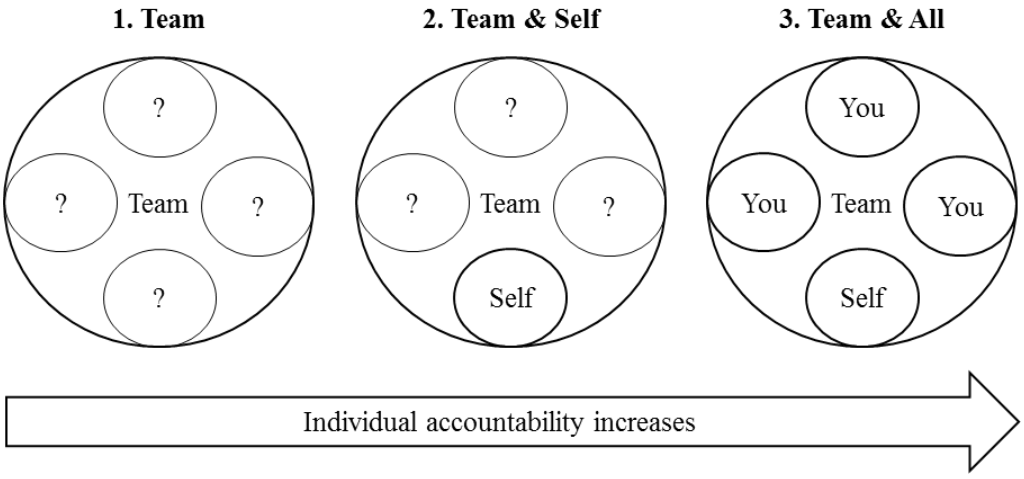


FIGURE 4. Integrated Process Model

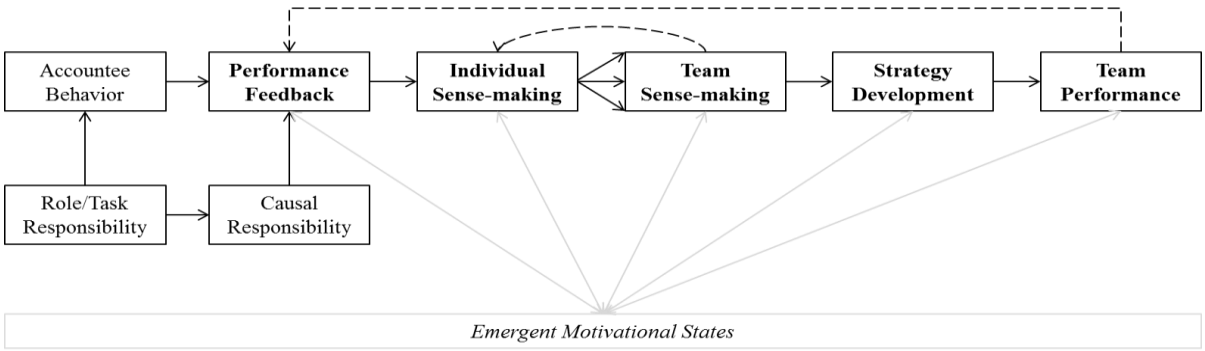


FIGURE 5. Interactive Effects of Accountability on Team Responses to Underperformance Feedback

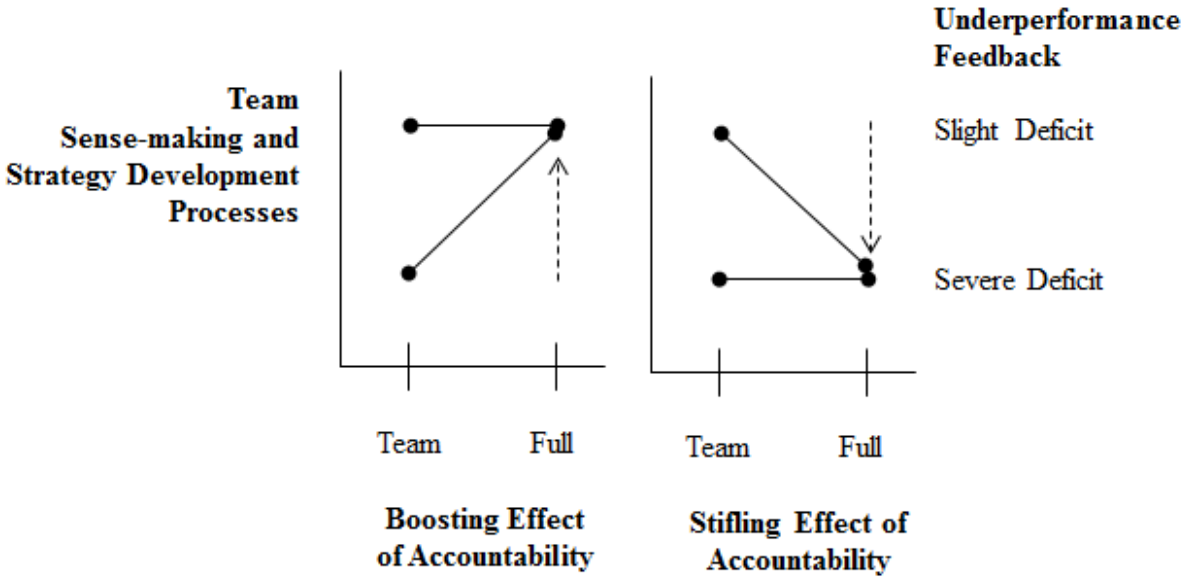
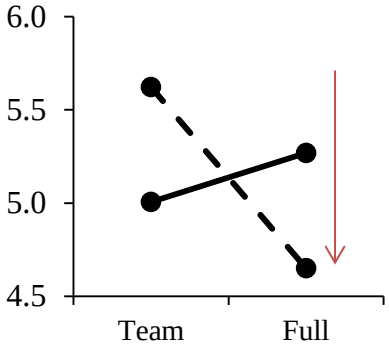


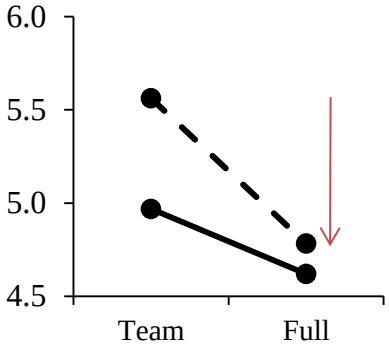
FIGURE 6. Plots of Significant Contrasts of Individual Sense-making Variables

- - slight team underperformance
— severe team underperformance

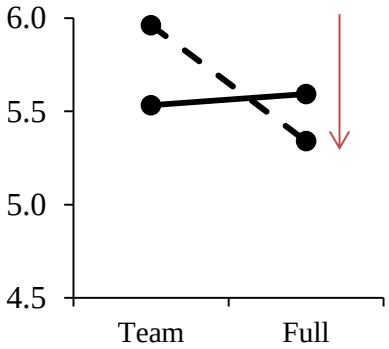
Shared Information



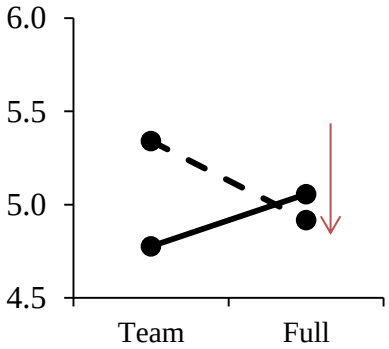
Helped Each Other



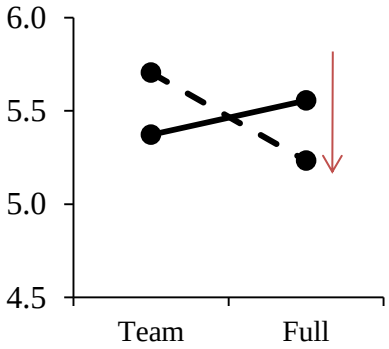
Cooperated



Communicated Clearly



Positive Social Interactions



Decision Making

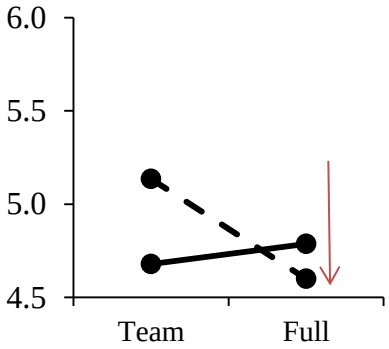
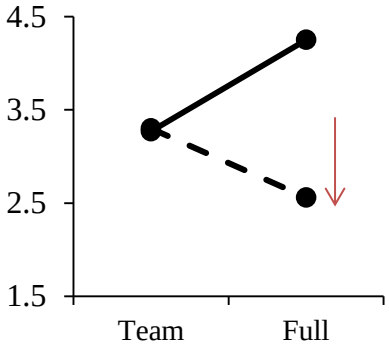


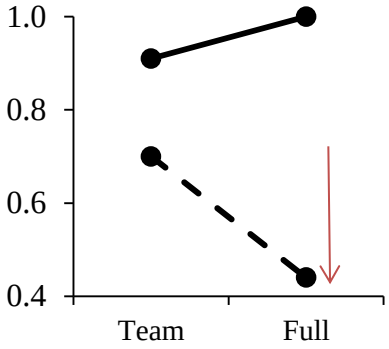
FIGURE 7. Plots of Significant Contrasts of Team Sense-making & Strategy Development

- - slight team underperformance
— severe team underperformance

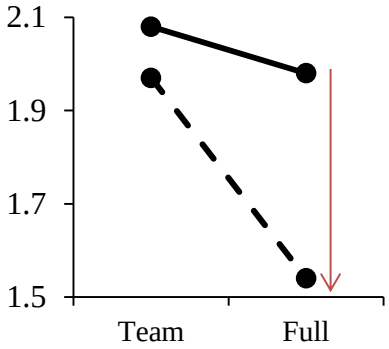
Performance Causes



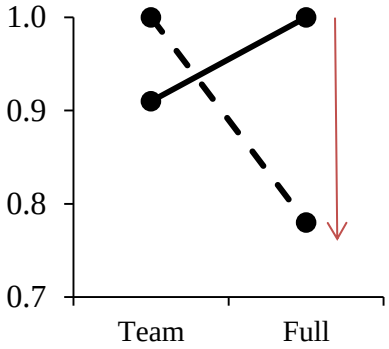
Helping Offered



Role Revisions



Leadership Participation



Workflow Revisions

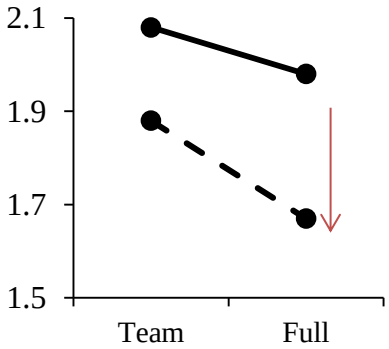


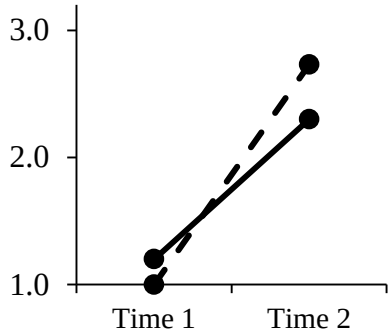
FIGURE 8. Plots of Actual Team Performance

- - team accountability

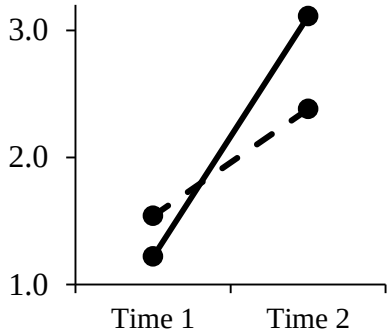
— full accountability

Ferraris Completed

Slight Underperformance

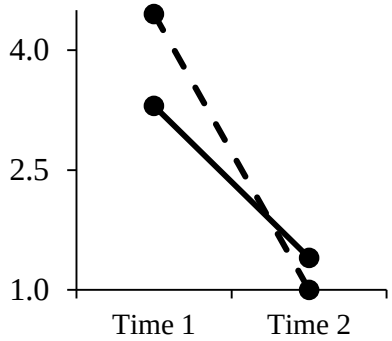


Severe Underperformance

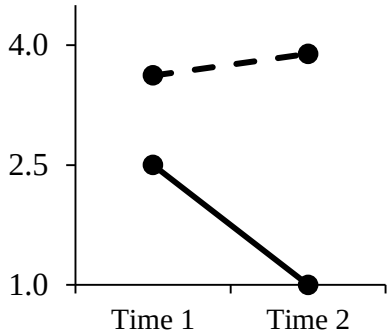


Materials Wasted

Slight Underperformance



Severe Underperformance



Appendix 1. Pilot Study Protocol

Background Questions

Birth year
Gender identification
Self-described ethnicity
Months of full-time work experience
Months of part-time work experience
Familiarity with team members

Instructions for Assembly Teams

Overview. Your team is responsible for manufacturing the legendarily hand-crafted Ferrari Testarossa. Demand for this luxury vehicle is strong and your responsibility is to assemble and finish as many high quality vehicles as possible. Today you will be working together during two shifts of 12 minutes each. At the end of your shifts, your product will undergo quality control testing you will receive information on the number of vehicles and their quality and appeal relative to other Ferrari production teams. Your team will have an opportunity to discuss your production processes before starting your second shift.

Raw materials. Photo of a Testarossa, main body structure (paper form), machining tools (scissors), welding supplies (glue & tape), production timer, finishing supplies (paint & black pen).

Official paint pallet. Bleu turchese (turquoise), blu sera (evening blue), giallo (yellow), grigio fumo (smoke grey), nocciola (chestnut brown), oro chiaro (champagne), rosso rubino (ruby red), verde pino (pine green)

Role responsibilities. Cutter: Responsible for cutting out the main body of the vehicle. Leave the tabs intact for the assembler. Painter: Responsible for selecting and applying paint finish. Assembly Preparer: Responsible for folding along the indicated lines and using the black pen to write the assembly information the front license plate. For example, Team 3, Production Run 1, Vehicle 4 would read "T03-PR1-V04". Assembler: Responsible for using welding supplies of tape and glue to assemble the vehicle. Dots on the main body of the vehicle indicate where glue may be placed.

Instructions. Sit at your assigned work station. Start working when your shift begins. Place finished vehicles in the finished product box for quality control evaluations. At the end of the shift, place unfinished parts and vehicles in the inventory-return box, return unused materials to their original location, and tidy your work station.

Assembly Team Report

Team number, team size, inspection team members.

Evaluation report. Number of vehicles ready for inspection, wasted resources, quality control failure incidents, sum of points earned.

Sample components of quality inspection. Cutting imprecision, dimensional distortion of lower body space frame, dimensional distortion of roof structure, excess body material discarded in cutting, excess or inadequate adhesives, extra body material retained in cutting, faulty wheel curvature, flawed paint application, incorrect alignment of weld joints, instability of finished vehicle, license plate illegibility and inaccuracy, narrow range of finishes, overlapping weld joints, seam softness and asymmetry, trim flaws, unpopular color selection.

Percentile ranking relative to previous assembly teams (same team size & time).

Individual Report

Cutter. Number cut, sample components of quality inspection (cutting imprecision, excess body material discarded in cutting, extra body material retained in cutting, faulty wheel curvature), performance relative to other cutters.

Painter. Number painted, sample components of quality inspection (flawed paint application, narrow range of finishes, trim flaws, unpopular color selection), performance relative to other painters.

Assembly preparer. Number prepared for assembly, sample components of quality inspection (dimensional distortion of lower body space frame, dimensional distortion of roof structure, license plate illegibility and inaccuracy, seam softness and asymmetry), performance relative to other assembly preparers.

Assembler. Number assembled, sample components of quality inspection (overlapping weld joints, instability of finished vehicle, excess or inadequate adhesives, incorrect alignment of weld joints), performance relative to other assemblers.

Individual Response to First Shift

To what do you attribute your team's successes and shortcomings?

Open-ended response.

To what do you attribute your team's shortcomings?

Open-ended response.

This questionnaire consists of statements about your team, and how your team functions as a group. To what extent did each of these factors contribute to your team's successes?

Team members generally:

Worked equally hard on our task.
Shared information.
Cooperated with each other to get work done.
Had positive social interactions with each other.
Helped each other out when needed.
Knew what was expected of them.
Communicated with each other clearly.
Participated in our decision making.
Took our team task seriously.

This questionnaire consists of statements about your team, and how your team functions as a group. To what extent did each of these factors contribute to your team's shortcomings?

Team members generally:

Did less than their fair share of work.
Withheld information.
Avoided cooperating to get work done.
Had negative social interactions with a team mate.
Did not help a teammate out when needed.
Were confused about what was expected of them.
Failed to clearly communicate with each other.
Did not contribute to our decision making.
Did not take our team task seriously.

To what extent do you feel:

Attached to the results of your work?
A sense of ownership for the vehicles you work on?
Protective about your work when it leaves your station?
A degree of personal ownership for your final product?
Like you own your assembly role?

To what extent do you agree or disagree with the following statements?

Producing my part of a quality Ferrari is well within my skillset.
I can meet my responsibilities with reasonable time and energy.
With focus and effort, I can do the work I set out to accomplish.
I am capable of meeting the high demand for Ferraris.
My abilities are good enough to do my assignment.

To what extent do you agree or disagree with the following statements?

Producing a quality Ferrari is well within this team's skillset.
This team can meet its responsibilities with reasonable time and energy.
With focus and effort, this team can do the work it set out to accomplish.
This team is capable of meeting the high demand for Ferraris.
This team's abilities are good enough to do our assignment.

To what extent to you agree or disagree with the following statements?

We are all committed to working together.
This team wants to do a good job.
This team is determined to do its best.
We care how well we do on our assignments.
All of us want to be involved in improving our performance.

To what extent to you agree or disagree with the following statements?

Some team members avoid working together.
One or more teammates do not want to do a good job.
Some people on this team are not committed to doing their best.
There are people on this team who do not care how well we do on our assignments.
Not everyone wants to be involved in improving our performance.

Team Planning Document

***Instructions*:**

Your team has a 7-minute break between shifts. You can use this time to analyze what went well and what went poorly, as well as to plan how to maintain or change the quality or quantity of Ferraris coming off your assembly line. If any changes will be implemented going forward, please record them below for the plant's production files.

Plant records:

No, we are not making changes.
Yes, we are making changes (briefly list below and explain why).

Individual Response to Second Shift

Did your team elect to make changes?

Yes (continue to measure)
No (end measure)

To what extent to you agree or disagree with the following statements?

I endorse our plan going forward.
I am enthusiastic about how we intend to work together.
Most of my team appears to support our plan going forward.
Most members of my team appear enthusiastic about how we intend to work together.
I wish we had come up with another plan.
I have reservations about our strategy.
I am indifferent to this plan of action.

To what extent to you agree or disagree with the following statements?

We are all committed to working together.
This team wants to do a good job.
This team is determined to do its best.
We care how well we do on our assignments.
All of us want to be involved in improving our performance.

To what extent to you agree or disagree with the following statements?

Some team members avoid working together.
One or more teammates do not want to do a good job.
Some people on this team are not committed to doing their best.
There are people on this team who do not care how well we do on our assignments.
Not everyone wants to be involved in improving our performance.

To what extent do you agree or disagree with the following statements?

Producing my part of a quality Ferrari is well within my skillset.
I can meet my responsibilities with reasonable time and energy.
With focus and effort, I can do the work I set out to accomplish.
I am capable of meeting the high demand for Ferraris.
My abilities are good enough to do my assignment.

To what extent do you agree or disagree with the following statements?

Producing a quality Ferrari is well within this team's skillset.
This team can meet its responsibilities with reasonable time and energy.
With focus and effort, this team can do the work it set out to accomplish.
This team is capable of meeting the high demand for Ferraris.
This team's abilities are good enough to do our assignment.

During the second production shift, my team:

Met or exceeded the work it set out to accomplish.
Completed our work in a timely manner.
Made sure that products and services met or exceeded quality standards.
Responded quickly when problems come up.
Was a productive team.
Successfully solved problems that slowed down our work.

During the second production shift, my team:

Created attractive Ferraris.
Carefully assembled Ferraris.
Produced a good number of Ferraris.
Accurately labeled each Ferrari.
Avoided wasting inventory.

To what extent to you agree or disagree with that the following statements describe your second production shift?

We were committed to working together.
This team wanted to do a good job.
This team was determined to do its best.
We cared how well we do on our assignments.
All of us wanted to be involved in improving our performance.

To what extent to you agree or disagree that the following statements describe your second production shift?

Some team members avoided working together.
One or more teammates did not want to do a good job.
Some people on this team were not committed to doing their best.
There are people on this team who did not care how well we did on our assignments.
Not everyone wanted to be involved in improving our performance.

To what extent to you agree or disagree with the following statements?

Most team members:

Found being part of this team to be a satisfying experience
Feel like they learned from working together.
Would welcome another opportunity to work as a group.
Would describe working together as enjoyable.
See the benefit in continued collaboration if there were another shift.

Indicate the performance information you received in your report at the end of the first shift (check all that apply):

Overall team performance
Your individual performance
The individual performance of one or more of your teammates
None

Was your team performance on the first production shift above average?

Significantly above average (above 70th percentile)
Moderately above average (61-70th percentile)
Slightly (51-60th percentile)

Was your team performance on the first production shift below average?

Slightly below average (40-49th percentile)
Moderately below average (30-39th percentile)
Significantly below average (less than 30th percentile)

To what extent do you agree or disagree with the following statements?

I cannot accomplish my tasks without information or materials from other members of my team.
Other members of my team depend on me for information or materials needed to perform their tasks.
Within my team, jobs performed by team members are related to one another.

Appendix 2. Pilot Study Qualitative Analyses

Ferrari Paint Quality

1 = clearly “not finished” with patches of paint missing
2 = finished but very “sloppy”
3 = “adequate” but with one major problem (such as the windshield) or a few minor issues
4 = “above average”, no big mistakes and careful paint application
5 = “excellent”, error free, even paint, with attention to small details or creative touches

Assembly Quality

Cutting and folding:

1 = major mistakes in cutting (too much or too little), folding is on the wrong seams
2 = poor cut (some obvious mistakes) or poor fold (weak or soft spots)
3 = average cut and fold (followed the outline when cutting, folds are accurate and somewhat sharp)
4 = "above average" cut or fold (attention to detail in cutting or folding, such as good wheels, curved rear fender, etc.)
5 = "excellent" with precise folds, no mistakes, and cut exactly along the outline

Tape or glue:

1 = car is falling apart
2 = car is weakly held together
3 = sturdy but with noticeably gaps or flaws in joints
4 = sturdy and no major flaws in how put together
5 = sturdy and without gaps or mistakes

Coding of Individual Attributions for Failure

Structural obstacles. Missing one person, bottleneck in production, time limits.

Team self blame. Poor communication, lack of organization, socializing.

Other team members. Males attempting creativity, cutter, painter.

Self blame. My performance.

Unclear blame. Didn't understand what to do, wasted materials, quality control problems.

Coding of Videos

Length of discussion?

Participation? All and even, dominated by one member, faultline/subset active, silent member (or only brief comment).

Problem identification/why fail?

1 = no mention of reasons for failure
2 = superficial discussions of reasons
3 = some/few issues identified
4 = some depth
5 = full blown discussion

Focus of discussion?

Solution focus, blame focus, individual finger pointing, individual self-blame.

Solutions offered?

Goals set?

Quantity goal, quality goal, waste reduction goal.

Revision in individual role responsibilities?

1 = none
2 = some shifting
3 = everyone has different responsibilities

Revision in work flow?

1 = left the same
2 = some revision
3 = radical revision

Discussion energy?

1 = apathetic
5 = enthusiastic

Conversational tone?

1 = combative
5 = collaborative

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